APPENDIX K

Geotechnical Due Diligence Study

GEOTECHNICAL DUE DILIGENCE STUDY
48-ACRE PARCEL 8
NORTHEAST OF INTERSTATE 5
AND CANNON ROAD
CARLSBAD, CALIFORNIA

Project No. 129452

Prepared for:

Caruso Affiliated
101 The Grove Drive
Los Angeles, California 90036

November 15, 2012

November 15, 2012
Project No. 129452

Mr. Peter Hayden
Caruso Affiliated
101 The Grove Drive
Los Angeles, California 90036

Subject: Geotechnical Due Diligence Study
48-Acre Parcel 8
Northeast of Interstate 5 and Cannon Road
Carlsbad, California

Dear Mr. Hayden:

This report presents the results of our geotechnical due diligence study of a 48-acre Parcel located northeast of Interstate 5 and Cannon Road in Carlsbad, California.

We appreciate this opportunity to be of continued service and look forward to future endeavors. If you have any questions about our report, please contact us at (858) 320-2000.

Very truly yours,

KLEINFELDER, INC.

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EXECUTIVE SUMMARY

This report presents the results of our geotechnical due diligence-level study for the site shown on Plates 1 and 2, Site Vicinity Map and Field Exploration Map, respectively. Kleinfelder's work was performed to support Caruso Affiliated's (Caruso) assessment of the site for potential acquisition. Based on conversations with Caruso and our review of a confidential preliminary site plan, we understand that future development may include a shopping center and associated parking lots.

The 48-acre site is located east of Interstate 5, north of Cannon Road, south of Aqua Hedionda Lagoon, and west of an undeveloped agricultural field. The irregular-shaped parcel is approximately 870 feet in width with a maximum length on the order of 3,000 feet. The site has been used for agricultural purposes for many years and is currently being used by Aviara Farms, Inc. to grow strawberries. Slopes along the northern boundary descend approximately 50 to 70 feet to the Aqua Hedionda Lagoon. The Preliminary North Boundary Development Setback Analysis (Planning Systems, 2011) shows a development setback line that is based on a 100-foot setback from the assumed wetland boundary and a 20-foot setback from the Habitat Management Plan hardline. Although variable, the typical setback appears to be on the order of 30 feet from the top of slope.

The site is underlain by topsoil, undifferentiated alluvium / colluvium, Pleistocene-age paralic deposits (terrace deposits), and Eocene-age Santiago Formation.

- Shallow topsoil is located at the surface of the site and is derived from disturbance of the underlying terrace deposits for agricultural use. Review of the previous explorations by Leighton (2004) and our current explorations indicates the topsoil is typically 1 to 3 feet deep.
- Alluvium / Colluvium was identified in our Boring B-5 in the northwest trending topographic depression leading toward the northeastern slope and on the slopes. Review of the previous explorations by Leighton and our current explorations indicates this unit extends to depths of approximately 10 to 15 feet in the area above the slope. The approximate limits are presented on Plate 2. This unit consists of soft to stiff lean and fat clay with some gravel and cobble, and is anticipated to be highly expansive. This material is unsuitable for support of improvements in development areas since it is uncompacted and has a potential

for expansion. Complete removal would be required and the expansive clays could be placed in landscape areas and potentially deeper fills.

- Terrace deposits are present below the topsoil and overlie the Santiago Formation. The terrace deposits generally consist of medium dense, fine to medium grained, silty and clayey sand. In general, the terrace deposits have a very low to low expansion potential.
- Santiago Formation was encountered in all borings at depths between about 11 to 18 feet and consists of hard to weakly cemented clay. The Santiago Formation is anticipated to have a high expansion potential but is not anticipated to be encountered during site grading.
- Groundwater was not encountered in the current borings or test pit excavations, although wet conditions and possibly perched water was encountered within Borings B-7 and B-8 at the contact between the granular terrace deposits and the underlying fine-grained Santiago Formation. The groundwater table may fluctuate with seasonal variations in precipitation and irrigation.

Potential geologic hazards considered in our study include, fault surface rupture, seismic shaking, landslides, liquefaction, seismically induced settlement, unconsolidated soils, tsunamis, seiches, flooding, and expansive soils.

- Based on our review of geologic maps, stereoscopic aerial photographs, and geologic reconnaissance, the subject site is not underlain by known active or potentially active faults, nor does the site lie within an Alquist-Priolo Earthquake Fault Zone. The potential for ground rupture due to faulting at the sites is considered low.
- The Santiago Formation is considered to be susceptible to landslides; however, regional mapping and down hole geologic logging of large diameter borings by Leighton (2004) indicate that the bedding has a favorable orientation into slope.
- No surficial indications of deep-seated landsliding were noted on site during our field reconnaissance or in the topographic maps and geotechnical reports we reviewed. However, an area of ancient landsliding was identified by Leighton approximately 1,800 feet east of the site on the slope descending to the lagoon. The landslides in this area were believed to be relatively shallow failures and not deep seated landslides.

- Preliminary slope stability analyses by Leighton (2004) indicate that structure setbacks from the top of the northern slopes above the lagoon will be required. A setback of 40 to 50 feet was previously recommended by Leighton.

Based on the results of our review, geologic reconnaissance and limited field and laboratory investigation, it is our opinion that site development is feasible from a geotechnical perspective. A summary of significant observations and geotechnical considerations pertaining to potential site development is presented below.

- The topsoil and possibly upper weathered portion of the terrace deposits are unsuitable for support of improvements in their current condition and would require removal and recompaction prior to placement of new fill. The alluvium / colluvium within the northeasterly trending drainage would also require removal but is likely not suitable for use as compacted fill below proposed improvements since it has a high potential for expansion.
- Perched groundwater on the Santiago Formation may be present during or following seasons of high precipitation. Groundwater seepage should be expected if excavations extend to Santiago formational contact.
- Grading plans were not available at the time of this report. However, it is anticipated that cutting and filling would be performed to create level building pads in the currently gently sloping terrain. Significant retaining walls or new slopes are not anticipated, with the possible exception of filling the topographic low in the northeastern portion of the site. This area is likely underlain by compressible and expansive colluvium / alluvium which would require removal and recompaction. The need for a retaining wall would depend on the potential proximity of proposed improvements to the designated North Boundary Development Setback and the depth of remedial grading.
- Grading operations may result in cut / fill transitions within proposed building footprints. We recommend that overexcavation and recompaction be performed on the cut portion in order to mitigate the potential for differential settlement of foundations and slab-on-grade. For preliminary planning purposes, the depth of remedial grading in cut areas may on the order of 5 feet or 3 feet below the bottom of foundations, whichever is deeper. The actual recommended extent and depth of this remedial grading should be established as part of the design-level geotechnical investigation.

- The majority of existing on-site soils within anticipated grading depths appear to have a low potential for expansion and are suitable material for use as fill, provided they are relatively free of organic material and debris. The clayey colluvium / alluvium in the topographic low in the northeastern portion of the site and the underlying Santiago Formation are anticipated to have a medium to high expansion potential and not suitable for use in improvement areas. Due to the depth to Santiago Formation and anticipated site grading, the Santiago Formation will likely not be encountered during site grading.
- We anticipate that the foundations for structures and equipment pads will consist of shallow spread and continuous footings founded on engineered fill or undisturbed dense terrace deposits. Deep foundations consisting of drilled piers or driven piles may be required for heavy column loads such as parking structures.
- For preliminary planning, a preliminary allowable soil bearing pressure of 3,000 psf may be assumed for spread and continuous footings. This value may be increased to 4,000 for larger structures founded in dense terrace deposits or fill compacted to a minimum relative compaction of 95 percent relative compaction.

The executive summary briefly summarizes results of our geotechnical study for the subject project and should be used only in conjunction with recommendations presented in the attached report. These preliminary recommendations are subject to confirmation during the design-level geotechnical investigation.

1 INTRODUCTION

1.1 PURPOSE AND SCOPE OF SERVICES

Caruso Affiliated (Caruso) is performing due diligence for potential acquisition of a 48-acre site referred to as Parcel 8. Based on conversations with Caruso and our review of a confidential preliminary site plan, we understand that future development may include a shopping center and associated parking lots. The purpose of our study was to present preliminary geologic and geotechnical considerations pertaining to potential development of the site in order to assist Caruso in evaluating the site. Supplemental subsurface exploration, laboratory testing, and analysis would be required during the future design-level phase.

Our scope of work included a site reconnaissance, review of regional geologic literature and readily available consultant reports, and performing a limited field and laboratory investigation to evaluate the subsurface conditions. Using data obtained from the above activities, we evaluated geologic hazards and developed geotechnical considerations for use in evaluating the site. Specifically, we performed the following tasks:

- Review of readily available geotechnical and geologic literature including previously completed geotechnical studies, topographic maps, geologic maps, and stereoscopic aerial photographs.
- Perform a geologic reconnaissance of the site.
- Perform a limited geotechnical subsurface field investigation and laboratory testing.
- Compilation and synthesis of the data obtained.
- Evaluation of potential geologic hazards including surface fault rupture, seismicity and ground shaking, liquefaction and seismic induced settlement, landsliding, expansive soils, unconsolidated soils, tsunamis and seiches, and flooding.
- Evaluation of potential impacts of subsurface conditions on future earthwork operations, including site preparation, temporary excavations, temporary slope inclinations, and fill placement.

- Evaluation of subsurface conditions on potential foundation types;
- Preparation of this report presenting our preliminary findings and conclusions, specifically those related to potential geologic and soils constraints that may impact site development and performance.

2 SITE DESCRIPTION AND HISTORY

2.1 SITE DESCRIPTION

The 48-acre site is located east of Interstate 5, north of Cannon Road, south of Aqua Hedionda Lagoon, and west of an undeveloped agricultural field. The location of the site is shown on the Site Vicinity Map, Plate 1. The irregular-shaped parcel is approximately 870 feet in width with a maximum length on the order of 3,000 feet. The site has been used for agricultural purposes for many years and is currently being used by Aviara Farms, Inc. to grow strawberries. Site topography slopes gently towards the north from a high elevation of approximately 75 feet mean sea level (msl) in the southeast corner to about 50 feet msl along northeastern portion of the northern slope. The slopes along the northern boundary descend approximately 50 to 70 feet to the Aqua Hedionda Lagoon. The slope inclination generally varies from 2:1 to 1½:1 with locally steeper areas. Sandbags were used to stabilize one portion of the slope in the vicinity of a drainage outlet. The Preliminary North Boundary Development Setback Analysis (Planning Systems, 2011) shows a development setback line that is based on a 100-foot setback from the assumed wetland boundary and a 20-foot setback from the Habitat Management Plan hardline. Although variable, the typical setback appears to be on the order of 30 feet from the top of slope. The approximate location of the setback line is presented on Plate 2.

Existing improvements are generally related to irrigation lines, pumps and a tank for agricultural purposes. Four sets of San Diego Gas and Electric 230 kV overhead transmission lines within a 560-foot wide easement traverse the southern portion of the site in an east-west direction. Subsurface utilities include a high-pressure gas line and a water main.

2.2 SITE HISTORY

Our understanding of the site is based on our discussions with you, representatives of Aviara Farms, and our review of documents provided by Caruso. In particular, we have reviewed previous geotechnical investigations performed by Benton Engineering, Inc. (1973) and Leighton and Associates, Inc. (Leighton, 1987 and 2004). The Benton report was performed for the San Diego Gas & Electric transmission line through the southern portion of the site but was of limited value due to its limited scope and lack of a plan of

exploration locations and geologic characterization. Our review of aerial photographs (United States Department of Agriculture, 1953) indicates the site was already cultivated for agricultural use in 1953, Interstate 5 had been constructed, and that current Cannon Road had not been constructed.

The 1987 preliminary geotechnical investigation by Leighton was performed for a proposed low-rise commercial development on the current Parcel 8 and included two large-diameter borings and 15 backhoe test pits. The 2004 due-diligence level review and limited geotechnical investigation was performed for a larger 255-acre site for potential residential development with a golf course. The 48-acre parcel which is the subject of our current investigation is located along the western side of the 255-acre study. Of the explorations performed for the 2004 study, the borings performed on Parcel 8 included two large diameter borings within the northern portion of the current parcel and an additional large diameter boring was performed about 200 feet east of the parcel. The approximate locations of the previous explorations are shown on the Field Exploration Map, Plate 2. The previous explorations for Parcel 8 and site plan are included in Appendix C of this report. The site has remained undeveloped and cultivated for agricultural fields since the time of the referenced reports.

3 INVESTIGATION METHODS

3.1 GEOLOGIC EVALUATION

Our geologic evaluation consisted of reviewing aerial photographs, geologic reports and maps reasonably available to our office, previous geotechnical provided by Caruso, and observation of the geotechnical conditions in the field at the time of our field reconnaissance and subsurface investigation. The geology of the site area is shown on the Regional Geologic Map, Plate 3.

3.2 LIMITED SUBSURFACE INVESTIGATION

Kleinfelder conducted a limited subsurface investigation that included eight borings and five test pits. The borings were excavated on September 10 and 11, 2012 to depths between 19 and 21 feet. The 8-inch diameter borings were excavated with a truck-mounted drill rig equipped with hollow stem augers and operated by Scott's Drill Company of Oceanside, California.

Five backhoe test pits were excavated on September 11, 2012. The depths of the excavations ranged from about 8 ½ to 10 ½ feet. The test pit excavations were performed by Cut'N Core Inc., of San Diego, California. The test pit excavations were backfilled with nominal effort applied by the bucket and wheels of the backhoe. The approximate location of each boring and test pit excavation is shown on Plate 2, Field Exploration Map, and logs of borings and test pit excavations are included in Appendix A, along with additional details of the field investigation.

3.3 LABORATORY TESTING

A limited laboratory testing program was conducted to evaluate physical characteristics of select soils encountered. The limited testing primarily consisted of moisture content and unit weight, grain size, Atterberg limits, direct shear, and R-value. The testing was performed in general accordance with the applicable ASTM test methods. Details of the laboratory testing program are presented in Appendix B.

4 SITE CONDITIONS

4.1 REGIONAL GEOLOGIC SETTING

The project site is situated in the western San Diego County section of the Peninsular Ranges geomorphic province of California. This province is characterized by mountainous terrain on the east composed mostly of Mesozoic igneous and metamorphic rocks, and relatively low-lying coastal terraces to the west underlain by late Cretaceous-, Tertiary-, and Quaternary-age sedimentary rocks. The portion of the province in San Diego County that includes the project site generally consists of Tertiary-age sedimentary units and Quaternary-age alluvial materials deposited in the inland valleys. The subject site is underlain by the Eocene-age Santiago Formation consisting of interbedded sandstone, siltstone and claystone, according to Tan and Kennedy (2005). During sea level changes during the Pleistocene, wave cut platforms eroded the Santiago Formation and marine terrace deposits were deposited onto the Santiago Formation.

4.2 REGIONAL FAULTING AND SEISMICITY

The Peninsular Ranges are traversed by several major active faults. The Whittier-Elsinore, San Jacinto, and the San Andreas faults are major active fault systems located northeast of the site and the Rose Canyon, Newport-Inglewood (offshore), Coronado Bank, and San Diego Trough are active faults located to the west-southwest. Tectonic activity associated with these and other faults is predominantly right-lateral strike-slip movement. These faults, as well as other faults in the region, have the potential for generating earthquakes and associated strong ground motions at the proposed sites. The nearest of these fault systems, the Rose Canyon fault, lies approximately 4½ miles to the west and is the most significant fault to the site with respect to the potential for seismic activity. Lindvall and Rockwell (1995) have described the Rose Canyon fault system in terms of several segments that each has distinctive earthquake potential. The closest segment is the Delmar segment which extends from La Jolla on the south to Oceanside on the north where it apparently merges with the Newport-Inglewood fault zone.

4.3 SITE GEOLOGY

The site is underlain by topsoil, undifferentiated alluvium / colluvium, Pleistocene-age paralic deposits (terrace deposits), and Eocene-age Santiago Formation. Descriptions of these units are provided in Appendix A (Boring Logs and Test Pit Excavations), and generalized descriptions are provided in the subsequent sections below, as described in the cited literature and as observed on the site.

4.3.1 Topsoil

Shallow topsoil is located at the surface of the site and is derived from disturbance of the underlying terrace deposits for agricultural use. This unit is not differiated from shallow fill that may be the result of contouring the fields or crating access roads. Review of the previous explorations by Leighton and our current explorations indicates the topsoil is typically 1 to 3 feet deep. The soil is typically dark brown, loose fine to medium grained, silty and clayey sand, with some gravel and and organics. This material is unsuitable for support of improvements since it is uncompacted and generally loose, and complete removal and recompaction of the material would be required.

4.3.2 Alluvium / Colluvium

Alluvium / Colluvium accumulates on and near the bottom of the natural slopes and drainages through a combination of stream deposition and gravitational processes. These materials were identified in Boring B-5 in the northwest trending topographic depression leading toward the northeastern slope and on the slopes. Review of the previous explorations by Leighton (2004) and our current explorations indicates this unit extends to depths of approximately 10 to 15 feet in the area above the slope. The approximate limits are presented on Plate 2. This unit consists of soft to stiff fat clay with some gravel and cobble. The clay is anticipated to be highly expansive. An additional area of suspected alluvium / colluvium was encountered in Test Pit TP-3 and extended to a depth of about 7 feet. This material is unsuitable for support of improvements in development areas since it is uncompacted and has a potential for expansion. Complete removal would be required and the expansive clays could be placed in landscape areas and potentially deeper fills.

4.3.3 Old Paralic Deposits Units 6 – 7 (Terrace Deposits)

Pleistocene-aged Old Paralic Deposits Units 6 – 7 are present blow the topsoil and overlie the Santiago Formation, with the exception of the localized alluvium / colluvium filled drainage area in the northeast portion of the site. Many geologic maps and literature referred to this unit as “terrace deposits” prior to recent geologic mapping (Kennedy and Tan, 2005). Based on the continued use of the term terrace deposits in the local geologic community, this term is used for purposes of this report. The terrace deposits generally consist of orange to red-brown, medium dense, fine to medium grained, silty and clayey sand. In general, the terrace deposits have a very low to low expansion potential. These materials are typically suitable for support of improvements in their current condition although some upper weathered areas may require recompaction.

4.3.4 Santiago Formation

The Cretaceous-age Santiago Formation has been mapped underlying the subject site (Kennedy and Tan, 2005), and was encountered in the previous consultant investigations (Leighton, 2004) and all of the borings performed during our subsurface evaluation. In general, this unit consists of massive to thickly-bedded sandstone with interbedded clayey siltstone and claystone. Our borings which only penetrated the upper portion encountered hard to weakly cemented clay. According to the Leighton report (2004), the deeper sandstones vary from very highly cemented with thin concretionary beds to moderately cemented and friable and the siltstones are massive to locally thinly bedded, and moderately well-cemented. Recorded SPT and California Sampler blow counts for the Santiago Formation were relatively high, having a range of penetration of 2 to 5 inches for 50 blows.

The clay layers are typically highly expansive and can represent potential planes of weakness in slope areas. Based on our understanding of potential site development, we anticipate that this unit is below the proposed grading and foundation depths.

4.4 GROUNDWATER

Groundwater was not encountered in the current borings or test pit excavations, although wet conditions and possibly perched water was encountered within Borings B-7 and B-8 at the contact between the granular terrace deposits and the underlying fine-grained

Santiago Formation. Our review of the Leighton report (2004), indicates that perched groundwater was encountered above the same geologic contact and near sea level elevation of the adjacent Agua Hedionda Lagoon. Vegetation on the northern slopes of the open space area also indicates the likely presence of perched groundwater conditions.

If proposed site development will include cuts that extend to the depth of perched groundwater, special construction considerations will be required. Based on our understanding of potential site development, we anticipate that this is below the proposed grading and foundation depths. However, groundwater could be encountered in excavations for deep foundations (piers and piles) if used. The groundwater table may fluctuate with seasonal variations in precipitation and irrigation.

5 DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 POTENTIAL GEOLOGIC HAZARDS

Potential geologic hazards considered in our study include, fault surface rupture, seismic shaking, landslides, liquefaction, seismically induced settlement, unconsolidated soils, tsunamis, seiches, flooding, and expansive soils. The following sections discuss these hazards and their potential at this site in more detail.

5.1.1 Seismic Shaking

The project area is considered to be seismically active, as is most of southern California. Based on our review of the referenced geologic maps, stereoscopic aerial photographs, and geologic reconnaissance, the subject site is not underlain by known active or potentially active faults (i.e., faults that exhibit evidence of ground displacement in the last 11,000 years and 1,600,000 years, respectively), nor does the site lie within an Alquist-Priolo Earthquake Fault Zone.

The Rose Canyon, Newport Inglewood Fault (offshore segment) is the closest active fault with an approximate distance of about 4½ miles to the west of the site. The maximum moment magnitude associated with the offshore segment of the Rose Canyon, Newport Inglewood Fault is 7.1 (Cao et. al., 2003).

5.1.2 Fault Surface Rupture

As previously discussed, the subject site is not underlain by known active or potentially active faults. Therefore, the potential for ground rupture due to faulting at the sites is considered low.

5.1.3 Landslides and Slope Stability

Landslides are deep-seated ground failures (several tens to hundreds of feet deep) in which a large arcuate or block shaped section of a slope detaches and slides downhill. Landslides should not be confused with minor slope failures (slumps), which are usually limited to the topsoil or colluvial zone and can occur on slopes composed of almost any geologic material. Several formations within the San Diego region are particularly prone to landsliding. These formations generally have high clay content and are more prone to mobilize when they become saturated with water. Other factors, such as steeply dipping

bedding that project out of the face of the slope and/or the presence of fracture planes, will also increase the potential for landsliding. The Santiago Formation is considered to be susceptible to landslides; however, regional mapping and down hole geologic logging of large diameter borings by Leighton (2004) indicate that the bedding has a favorable orientation into slope.

No surficial indications of deep-seated landsliding were noted on site during our field reconnaissance or in the topographic maps and geotechnical reports we reviewed. However, an area of ancient landsliding was identified by Leighton approximately 1,800 feet east of the site on the slope descending to the lagoon. The landslides in this area were believed to be relatively shallow failures and not deep seated landslides.

Leighton (2004) generated several geologic sections through the northern slopes, including one within Parcel 8. Slope stability analyses were performed to evaluate deep-seated global stability. Their analyses indicated a static factor of safety of at least 1.5 for the existing slope geometry at a setback on the order of 40 to 50 feet from the top of slope. The results of their slope stability analyses are presented in Appendix C. The static and seismic slope stability analyses and the soil strength parameters used in the analyses appear reasonable based on our field investigation, experience in the area and engineering judgment. It is our opinion that the potential for significant large-scale slope instability is considered low. However, development closer than the previously recommended 40- to 50-foot setback would likely require mitigation measures. Slope stability analyses should be performed by Kleinfelder during final design to assess and establish updated setback distances for development.

Portions of these slopes are underlain by thick colluvial deposits. Because of their natural condition and steep inclination of the slope, continued erosion and localized surficial sloughing and slumping will likely contribute to ongoing slope retreat.

5.1.4 Liquefaction and Seismic Settlement

The term liquefaction describes a phenomenon in which saturated, cohesionless soils temporarily lose shear strength (liquefy) due to increased pore water pressures induced by strong, cyclic ground motions during an earthquake. Structures founded on or above potentially liquefiable soils may experience bearing capacity failures due to the temporary loss of foundation support, vertical settlements (both total and differential), and undergo lateral spreading. The factors known to influence liquefaction potential

include soil type, relative density, grain size, confining pressure, depth to groundwater, and the intensity and duration of the seismic ground shaking. The cohesionless soils most susceptible to liquefaction are loose, saturated sands and some silts.

Seismic settlement can occur either as a result of post-liquefaction reconsolidation as porewater pressure dissipates, or in unsaturated, predominantly granular and loose soils that tend to densify during seismic shaking.

The subject site is underlain at depth by dense and hard formational soils. Based on the dense/firm and clayey/plastic nature of the on-site formational deposits, as well as the absence of shallow groundwater, it is our opinion that the potential for liquefaction and seismic settlement is very low. The saturated alluvial soils at the base of the northern slope by Aqua Hedionda Lagoon likely have a high potential for liquefaction; however, this is not anticipated to impact the proposed development area.

5.1.5 Expansive Soils

Expansive soils are characterized by their ability to undergo significant volume changes (shrink or swell) due to variations in moisture content. Changes in soil moisture content can result from precipitation, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors and may result in unacceptable settlement or heave of structures or concrete slabs supported on grade.

Based on the results of our review, limited investigation, and experience with similar materials, the majority of the soils above the Santiago Formation are expected to be non-expansive to low expansive. The clayey colluvium / alluvium in a localized area in the northwestern portion of the site is likely moderately to highly expansive and will require complete removal. The approximate limits of this material are shown on Plate 2, roughly in the area of the topographic low and the perimeter access road. The clay soil in the underlying Santiago Formation may have a high potential for expansion; however, these soils are not anticipated to impact the proposed development due to their anticipated depth below finish grade. These soils should be evaluated if proposed development plans extend near the Santiago Formation.

5.1.6 Tsunamis and Seiches

Tsunamis are long wavelength seismic sea waves (long compared to the ocean depth) generated by sudden movements of the ocean bottom during submarine earthquakes, landslides, or volcanic activity. A seiche is an oscillation (wave) of a body of water in an enclosed or semi-enclosed basin that varies in period, depending on the physical dimensions of the basin, from a few minutes to several hours, and in height from several inches to several feet. A seiche is caused chiefly by local changes in atmospheric pressure, aided by winds, tidal currents, and occasionally earthquakes. Based on the elevation of the parcel, the potential for damage due to either a tsunami or seiche is considered low.

5.1.7 Flood Hazard

According to a Federal Emergency Management Agency (FEMA) flood insurance rate maps (FEMA map panels numbers 0764G), the site is considered to be outside of 100-year and 500-year floodplains. Based on review of topographic maps, the parcel is not located downstream of a dam or within a dam inundation area. Based on this review and our site reconnaissance, the potential for flooding of the site is considered low.

5.2 GEOTECHNICAL CONSIDERATIONS FOR SITE DEVELOPMENT

Based on the results of our review, geologic reconnaissance and limited field and laboratory investigation, it is our opinion that site development is feasible from a geotechnical perspective. A summary of observations and geotechnical considerations pertaining to potential site development is presented below.

- The potential for geologic hazards such as fault surface rupture and liquefaction is considered low. The primary seismic hazard that may affect the site is ground shaking from one of the active regional faults. The nearest known active fault is the Rose Canyon Fault Zone, which is located approximately 4½ miles west of the site.
- Preliminary slope stability analyses by Leighton indicate that structure setbacks from the top of the northern slopes above the lagoon will be required. The width and location of the recommended setbacks will be dependent on the proposed development plan. A setback of 40 to 50 feet was previously recommended by Leighton.

- Existing slopes along the proposed sites are considered to be grossly stable, however, the surficial soils may be somewhat erodible due to their sandy nature, loose colluvium on the surface, and locally steep inclination.
- The site is primarily underlain by shallow topsoil over dense granular terrace deposits and hard to weakly indurated, fine-grained Santiago Formation. Alluvium / colluvium was encountered up to a depth of 15 feet within a northeasterly trending drainage feature in the northern portion of the site. Although the lateral extent of the alluvium is not known, the extent is likely not significant. Plate 2 presents the approximate limits based on available information.
- The topsoil and possibly upper weathered portion of the terrace deposits are unsuitable for support of improvements in their current condition and would require removal and recompaction prior to placement of new fill. The alluvium / colluvium within the northeasterly trending drainage would also require removal but is likely not suitable for use as compacted fill below proposed improvements since it has a high potential for expansion. Removal of the alluvium / colluvium may be impacted by the proximity to the North Boundary Development Setback.
- Although groundwater was not encountered in our subsurface investigation, our review indicates that perched groundwater may be present during or following seasons of high precipitation. The perched groundwater would occur at the geologic contact of the more permeable granular terrace deposits and the underlying relatively impermeable Santiago Formation clays. Groundwater seepage should be expected if excavations extend to this formational contact.
- Grading plans were not available at the time of this report. However, it is anticipated that cutting and filling would be performed to create level building pads in the currently gently sloping terrain. Significant retaining walls or new slopes are not anticipated, with the possible exception of filling the localized topographic low in the northeastern portion of the site. This area is likely underlain by compressible and expansive colluvium / alluvium which would require removal and recompaction. The need for a retaining wall would depend on the potential proximity of proposed improvements to the designated North Boundary Development Setback and the depth of remedial grading,

- Grading operations may result in cut / fill transitions within proposed building footprints. We recommend that overexcavation and recompaction be performed on the cut portion in order to mitigate the potential for differential settlement of foundations and slab-on-grade. For preliminary planning purposes, the depth of remedial grading in cut areas may on the order of 5 feet or 3 feet below the bottom of foundations, whichever is deeper. The actual recommended extent and depth of this remedial grading should be established as part of the design-level geotechnical investigation.
- The majority of existing on-site soils within anticipated grading depths appear to have a low potential for expansion and are suitable material for use as fill, provided they are relatively free of organic material and debris. The clayey alluvium / colluvium in the localized northeastern portion of the site and Santiago Formation are anticipated to have a medium to high expansion potential and not suitable for use in improvement areas.
- We anticipate that the foundations for structures and equipment pads will consist of shallow spread and continuous footings founded on engineered fill or undisturbed dense terrace deposits. Deep foundations consisting of drilled piers or driven piles may be required for heavy column loads such as parking structures.
- For preliminary planning, a preliminary allowable soil bearing pressure of 3,000 psf may be assumed for spread and continuous footings. This value may be increased to 4,000 for larger structures founded in dense terrace deposits or fill compacted to a minimum relative compaction of 95 percent relative compaction. These preliminary recommendations are subject to confirmation during the design-level geotechnical investigation.
- An R- value test was conducted on the upper silty sand to evaluate the pavement supporting capabilities of the near surface soils. The test results indicate an R-value of 37. For TI's of 5 and 7 pavement sections on the order of 3 inches of asphaltic concrete (AC) over 5 inches of aggregate base (AB) and 4 inches of AC over 8 inches of AB could be anticipated if similar R-value test results are obtained throughout the site.

- Corrosion screening tests were not performed at this time. It is our experience that similar granular terrace deposits in the site area are generally not considered corrosive to concrete and buried steel.

5.3 RECOMMENDATIONS FOR ADDITIONAL STUDY

A design-level geotechnical investigation will be required to support project design if the site is acquired. The existing subsurface information from this investigation and the previous explorations by others could be utilized in developing the exploration plan. The purpose of the study would be to further evaluate the subsurface conditions pertinent to proposed improvement locations and site grading and to provide information pertaining to the engineering characteristics of earth materials at the site. In particular, we recommend that the limits of the alluvium and colluvium in the northern portion of the site be further evaluated. We also recommend that corrosion testing be performed on on-site soil types and imported soils (if any) used in the project. Based on this study and the results of the recommended additional geotechnical evaluation and laboratory testing for the selected site, recommendations for grading/earthwork, surface and subsurface drainage, foundations, pavement structural sections, and other pertinent geotechnical design considerations may be formulated.

6 LIMITATIONS

Recommendations contained in this siting study are based on our review of reports by others, limited field observations and subsurface explorations, laboratory tests, and our present knowledge of the proposed project. It is possible that soil conditions could vary between or beyond the points explored. If soil conditions are encountered during design-level geotechnical investigations or construction that differ from those described herein, we should be notified immediately in order that a review may be made and any supplemental recommendations provided. If the scope of the proposed project, including the proposed foundation systems or structural locations, changes from that described in this report, our recommendations should also be reviewed and a response issued. We have not reviewed the grading plans or foundation plans for the project. References to elevations and locations provided within this report were based upon general information provided for our use. Kleinfelder, Inc. did not provide surveying services.

Other standards or documents referenced in any given standard cited in this report, or otherwise relied upon by the authors of this report, are only mentioned in the given standard; they are not incorporated into it or "included by reference", as the latter term is used relative to contracts or other matters of law.

We have strived to prepare the findings, conclusions, and recommendations in this report in a manner consistent with the standards of care and skill ordinarily exercised by members of this profession practicing under similar conditions in the geographic vicinity and at the time the services were performed. No warranty or guarantee, express or implied, is made. The recommendations provided in this report are preliminary and not suitable for final design, and are based on the assumption that Kleinfelder will be retained to perform a design level investigation of the selected site, provide a program of tests and observations during the construction phase in order to evaluate compliance with our recommendations and to evaluate the site conditions exposed. Information and recommendations presented in this report should not be extrapolated to other areas or be used for other projects without our prior review and response.

This report may be used only by Caruso Affiliated and only for the purposes stated, within a reasonable time from its issuance, but no more than 1 year, without update. Land use, site conditions (both on site and off site) or other factors may change over

time, and additional work may be required with the passage of time. Any party other than Caruso Affiliated who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site. Kleinfelder will assume no responsibility or liability whatsoever for any claim, damage, or injury which results from pre-existing hazardous materials being encountered or present on the project site, or from the discovery of such hazardous materials.

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PLATES

BASEMAP SOURCE: ESRI ONLINE MAPS

N

0 2,000 4,000 8,000 Feet

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DRAWN BY:	JP
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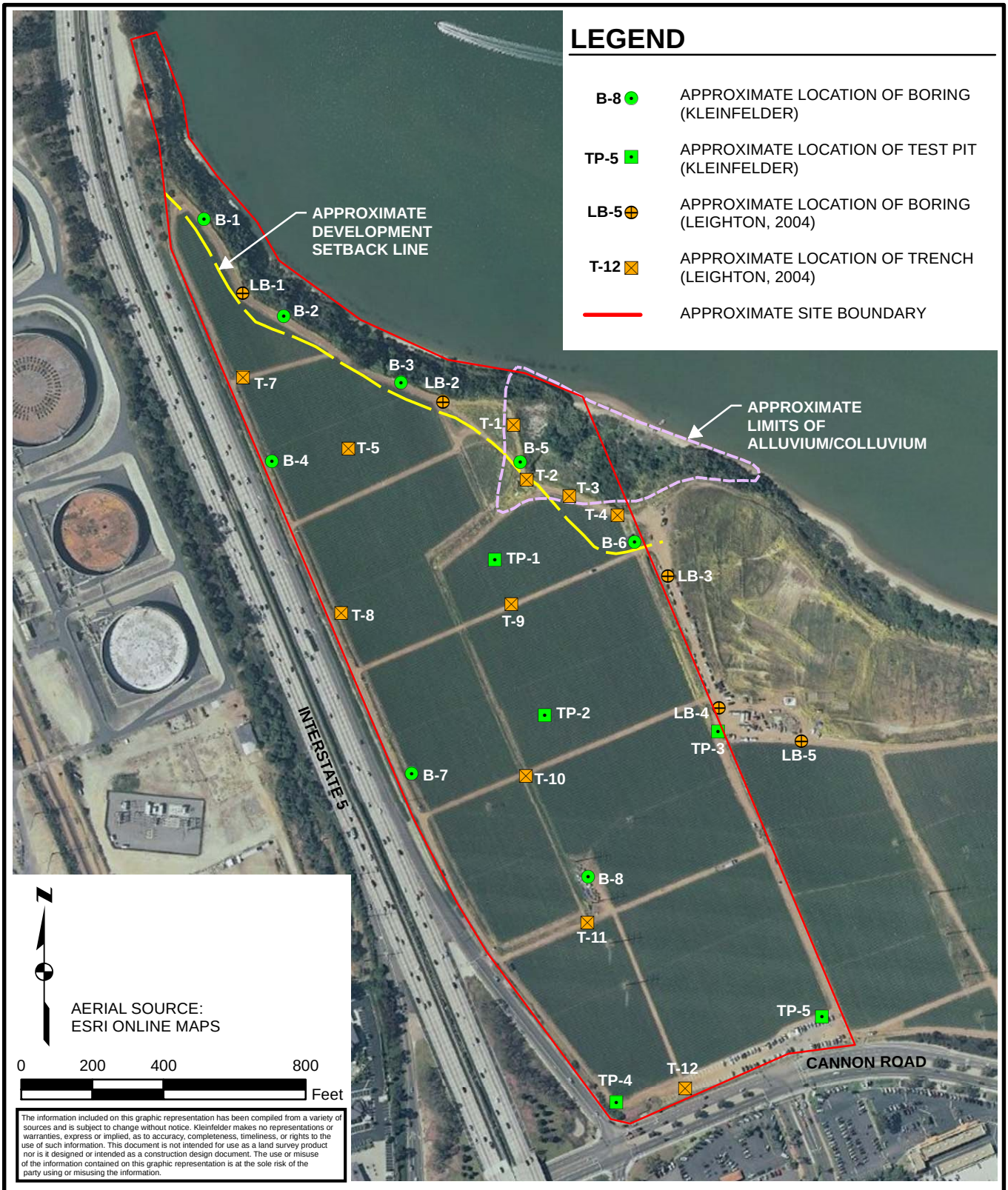
FILE NAME:	129452VIC.MXD

SITE VICINITY MAP

48-ACRE PARCEL 8
CANNON ROAD AND INTERSTATE 5
CARLSBAD, CALIFORNIA

PLATE

1



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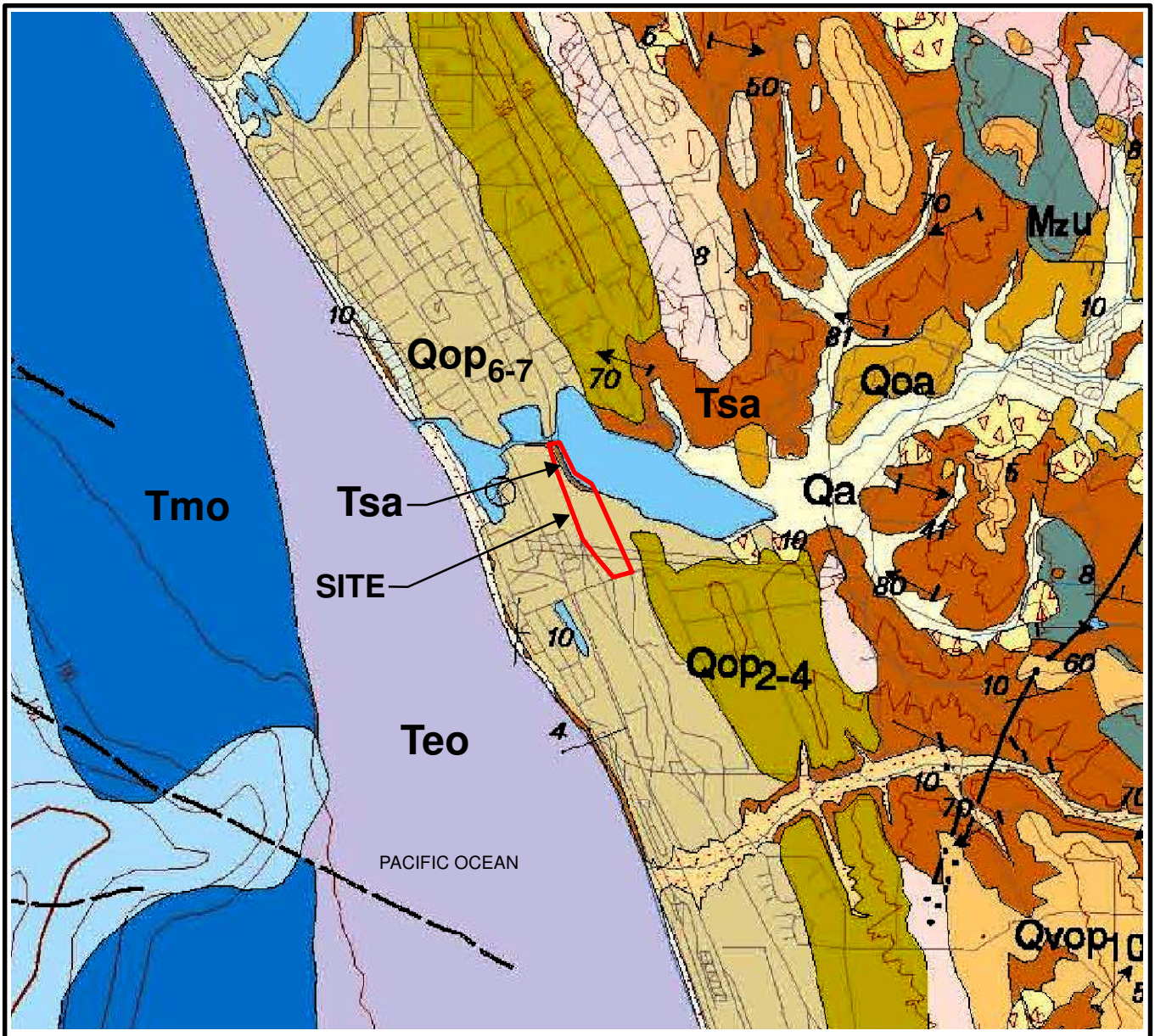
FIELD EXPLORATION MAP

48-ACRE PARCEL 8
CANNON ROAD AND INTERSTATE 5
CARLSBAD, CALIFORNIA

PLATE
2



BASEMAP SOURCE:
GEOLOGIC MAP OF THE OCEANSIDE
30' X 60' QUADRANGLE, CALIFORNIA,
BY KENNEDY AND TAN 2005

0 2,000 4,000 8,000
Feet

LEGEND

Qop_{6-7}	OLD PARALIC DEPOSITS, UNITS 6 AND 7
Qop_{2-4}	OLD PARALIC DEPOSITS, UNITS 2-4 UNDIVIDED
Tsa	SANTIAGO FORMATION
— — —	FAULT - DASHED WHERE INFERRED
4	STRIKE AND DIP OF BEDS

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REGIONAL GEOLOGIC MAP

48-ACRE PARCEL 8
CANNON ROAD AND INTERSTATE 5
CARLSBAD, CALIFORNIA

PLATE
3

APPENDIX A

FIELD EXPLORATION

APPENDIX A
FIELD EXPLORATION AND BORING LOGS

Prior to any subsurface exploration, Kleinfelder notified Underground Service Alert (USA) to clear proposed boring locations of conflicts with utilities. In addition, Kleinfelder subcontracted a private utility locating company to sweep the proposed boring locations for underground utilities at the site.

The subsurface investigation included eight borings and five test pits. The borings were excavated to depths between 19 and 21 feet. The 8-inch diameter borings were excavated with a truck-mounted drill rig equipped with hollow stem augers and operated by Scott's Drill Company of Oceanside, California. An engineer from our office supervised the field operations and logged the borings. Selected bulk, disturbed, and intact samples were retrieved from the borings, sealed, and transported to our laboratory for further evaluation. Our typical vertical sampling interval was five feet. The borings were backfilled using soil cuttings.

In-place soil samples were obtained at the test boring locations using a California penetration sampler driven a total of 18-inches (or until practical refusal), into the undisturbed soil at the bottom of the boring. The soil sampled by the California sampler (3-inch O.D., 2.4 inches I.D.) was retained in 6-inch long brass tubes for laboratory testing. The samplers were driven using a 140 pound automatic hammer falling 30 inches. The total number of hammer blows required to drive the sampler the final 12 inches is termed the blow count and is recorded on the Logs of Borings. The blow counts presented on the Logs have not been adjusted for the effects of overburden pressure, input driving energy, rod length, sampler correction, or boring diameter correction.

Five backhoe test pits were excavated to depths ranging from about 8 ½ to 10 ½ feet. An engineer from our office supervised the field operations and logged the pits. Selected bulk samples were retrieved from the excavations and transported to our laboratory for further evaluation. The test pit excavations were backfilled with nominal compactive effort applied by the bucket and wheel of the backhoe. The approximate location of each boring and test pit excavation is shown on Plate 2, Field Exploration Map.

Soil was classified in the field according to the Unified Soil Classification System (USCS) using the visual-manual procedure in accordance with ASTM D 2488. Field

descriptions and classifications were reviewed against the laboratory descriptions (ASTM D2487) and adjusted where laboratory data was available.

A Unified Soil Classification System (USCS) chart and a Boring Log legend are presented as Plates A1a and A1b, respectively. The Logs of Borings and test pits are presented as Plates A2 through A9. The Logs of Borings and test pit excavations describe the earth materials encountered, samples obtained, and show field and laboratory tests performed. The logs also show the general location, boring number, drilling date, and the names of the logger and drilling subcontractor. The boundaries between soil types shown on the logs are approximate because the transition between different soil layers may be gradual.

SAMPLE/SAMPLER TYPE GRAPHICS

BULK SAMPLE

MODIFIED CALIFORNIA SAMPLER
(2 or 2-1/2 inch outside diameter)

STANDARD PENETRATION SPLIT SPOON SAMPLER
(2 inch outside and 1-3/8 inch inner diameter)

GROUND WATER GRAPHICS

WATER LEVEL (level where first observed)

WATER LEVEL (level after exploration completion)

WATER LEVEL (additional levels after exploration)

OBSERVED SEEPAGE

NOTES

1. The report and log key are an integral part of these logs. All data and interpretations in this log are subject to the stated explanations and limitations stated in the report.

2. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.

3. No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.

4. Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.

5. In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate by visual classifications in the office and/or laboratory gradation and index property testing.

6. Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.

7. If sampler is not able to be driven at least 6 inches, 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pounds hammer falling 30 inches.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	**GRAVELS** (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥4 and 1≤ Cc≤3		**GW**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu <4 and/ or 1>Cc >3		**GP**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5% TO 12% FINES	Cu ≥4 and 1≤ Cc≤3		**GW-GM**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu <4 and/ or 1>Cc >3		**GP-GM**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH > 12% FINES			**GM**	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
					GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
					GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥6 and 1≤ Cc≤3		**SW**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu <6 and/ or 1>Cc >3		**SP**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu ≥6 and 1≤ Cc≤3		**SW-SM**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu <6 and/ or 1>Cc >3		**SP-SM**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH > 12% FINES			**SM**	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
					SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
					SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES

FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)	**ML**	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid Limit greater than 50)	**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

NOTE: USE MATERIAL DESCRIPTION ON THE LOG TO DEFINE A GRAPHIC THAT MAY NOT BE PROVIDE ON THIS LEGEND.

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DATE:	9/28/2012
REVISED:	9/28/2012

GRAPHICS KEY

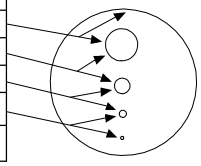
48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

A-1

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12"	>12"	Larger than basketball-sized
Cobbles		3 - 12'	3 - 12"	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3"	3/4 -3"	Thumb-sized to fist-sized
	fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19"	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock salt-sized
	fine	#200 - #10	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029	Flour-sized and smaller



Munsell Color

NAME	ABBR
Red	R
Yellow Red	YR
Yellow	Y
Green Yellow	GY
Green	G
Blue Green	BG
Blue	B
Purple Blue	PB
Purple	P
Red Purple	RP

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular description but have rounded edges
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges

PLASTICITY

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N_{60} (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12- 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

NOTE: AFTER TERZAGHI AND PECK, 1948

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (Qu)(psf)	CRITERIA
Very Soft	< 1000	Thumb will penetrate soil more than 1 in. (25 mm)
Soft	1000 - 2000	Thumb will penetrate soil about 1 in. (25 mm)
Firm	2000 < 4000	Thumb will indent soil about 1/4 in. (6 mm)
Hard	4000 < 8000	Thumb will not indent soil but readily indented with thumbnail
Very Hard	> 8000	Thumbnail will not indent soil

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4 in. thick, note thickness
Laminated	Alternating layers of varying material or color with the layer less than 1/4 in. thick, note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

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DATE:	9/28/2012
REVISED:	9/28/2012

SOIL DESCRIPTION KEY

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

A-2

BORING LOG B-1

Date Begin - End:	9/10/12	**Drill Company:**	Scott's Drilling		
Logged By:	E. Koprulu	**Drill Crew:**			
Hor.-Vert. Datum:	NAD83	**Drill Equipment:**	Ingersoll A-300	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Angle from Vert.:	0 degrees	**Exploration Method:**	Hollow Stem Auger		
Weather:	Sunny	**Auger Diameter:**	8 in.		

FIELD EXPLORATION

Latitude: 33.142036° N
Longitude: -117.332366° W
Approximate Surface Elevation (ft): 52.0

Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Sample Type	Blow Counts(BC)= Uncorr. blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
50						SM				34			R-value (37)
				BC=27 27 32		SC	7.3	130					
	5			BC=4 5 9			3.9	110					
45													
	10			BC=22 28 36									
40													
	15			BC=5 8 18			2.8	108					
35													
				BC=33 50/6"									
20													
	20												
30													
	25												
25													
	30												
20													

Topsoil
Silty SAND (SM): fine grained, dark brown, moist, loose

Terrace Deposits
Clayey SAND (SC): fine to coarse grained, low plasticity fines, reddish brown to gray, moist, very dense

Silty SAND (SM): fine to coarse grained, non-plastic fines, brown, moist, medium dense

Poorly-Graded SAND with Silt (SP-SM): fine to medium grained, non-plastic fines, grayish brown, moist, very dense, iron-oxide staining, micaceous, friable

Poorly-Graded SAND (SP): fine to coarse grained, non-plastic fines, grayish brown, moist, medium dense, micaceous

Santiago Formation
Sandy CLAY (CL): fine to coarse grained, low plasticity fines, gray, moist, hard, weakly cemented

The exploration was terminated at approximately 19 ft. below ground surface. The exploration was backfilled with auger cuttings on September 10, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG B-1

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE
A-3
PAGE: 1 of 1

BORING LOG B-2

Date Begin - End:	9/10/12	**Drill Company:**	Scott's Drilling		
Logged By:	E. Koprulu	**Drill Crew:**			
Hor.-Vert. Datum:	NAD83	**Drill Equipment:**	Ingersoll A-300	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Angle from Vert.:	0 degrees	**Exploration Method:**	Hollow Stem Auger		
Weather:	Sunny	**Auger Diameter:**	8 in.		

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION Latitude: 33.141282° N Longitude: -117.331513° W Approximate Surface Elevation (ft): 56.0 Surface Condition: Bare Earth	Sample Type	Blow Counts(BC)= Uncorr. blows/6 in.	Recovery (NR=No Recovery)	LABORATORY RESULTS USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
55			**Topsoil** **Silty SAND (SM)**: fine grained, dark brown, moist, loose											
			Terrace **Clayey SAND (SC)**: fine to coarse grained, low plasticity fines, reddish brown, moist, dense to very dense, micaceous		BC=24 30 47			6.9	130					
50	5				BC=13 14 18									
			Poorly-Graded SAND (SP): fine to coarse grained, non-plastic fines, light brownish gray, moist, dense, friable		BC=14 20 22		SP	2.7	106		6.0			
45	10													
	15		very dense, friable		BC=50/6"									
40			**Santiago Formation** **Sandy CLAY (CL)**: fine grained, low to medium plasticity fines, gray, moist, hard, weakly cemented		BC=50/6"									
	20													
35														
	25													
30														
	30													
25														

The exploration was terminated at approximately 19 ft. below ground surface. The exploration was backfilled with auger cuttings on September 10, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

KLEINFELDER
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PROJECT NO.:	129452
DRAWN BY:	CL
CHECKED BY:	KC
DATE:	9/28/2012
REVISED:	9/28/2012

BORING LOG B-2

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE
A-4

PAGE: 1 of 1

Date Begin - End: 9/10/12 **Drill Company:** Scott's Drilling

BORING LOG B-3

Logged By: E. Koprulu **Drill Crew:**

Hor.-Vert. Datum: NAD83 **Drill Equipment:** Ingersoll A-300 **Hammer Type - Drop:** 140 lb. Cathead - 30 in.

Angle from Vert.: 0 degrees **Exploration Method:** Hollow Stem Auger

Weather: Sunny **Auger Diameter:** 8 in.

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION	Sample Type	Blow Counts(BC)= Uncorr. blows/6 in.	Recovery (NR=No Recovery)	LABORATORY RESULTS: USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
			Latitude: 33.140747° N Longitude: -117.33036° W Approximate Surface Elevation (ft): 55.0 Surface Condition: Bare Earth											
			Topsoil **Silty SAND (SM)**: fine grained, dark brown, moist, loose											
			Terrace Deposits **Clayey SAND (SC)**: fine to coarse grained, low plasticity fines, reddish brown, moist, medium dense		BC=3 10 10									Direct Shear
50	5		**Silty SAND (SM)**: fine to coarse grained, non-plastic fines, light brown, moist, loose		BC=6 5 3									
45	10		becomes reddish brown, very dense		BC=50/6"									
			Santiago Formation **Sandy CLAY (CL)**: fine grained, low plasticity fines, gray, moist, hard, moderately cemented		BC=28 50/6"									
40	15		low to medium plasticity fines, moderately to strongly cemented		BC=18 25 35									
35	20													
30	25													
25	30													

The exploration was terminated at approximately 20 ft. below ground surface. The exploration was backfilled with auger cuttings on September 10, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	129452
DRAWN BY:	CL
CHECKED BY:	KC
DATE:	9/28/2012
REVISED:	9/28/2012

BORING LOG B-3

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

A-5

PAGE: 1 of 1

BORING LOG B-4

Date Begin - End:	9/10/12	**Drill Company:**	Scott's Drilling		
Logged By:	E. Koprulu	**Drill Crew:**			
Hor.-Vert. Datum:	NAD83	**Drill Equipment:**	Ingersoll A-300	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Angle from Vert.:	0 degrees	**Exploration Method:**	Hollow Stem Auger		
Weather:	Sunny	**Auger Diameter:**	8 in.		

FIELD EXPLORATION

Latitude: 33.140536° N
Longitude: -117.33194° W
Approximate Surface Elevation (ft): 62.0

Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Description	Sample Type	Blow Counts(BC)= Uncorr. blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
60	0		**Topsoil** **Silty SAND (SM)**: fine grained, dark brown, moist, loose											
55	5		**Terrace Deposits** **Clayey SAND (SC)**: fine to medium grained, low plasticity fines, reddish brown, moist, very dense to dense, micaceous		BC=14 19 24									
			Silty SAND (SM): fine to coarse grained, non-plastic fines, reddish brown to grayish brown, moist, dense, micaceous											
50	10				BC=14 19 24									
	15		becomes grayish brown, friable		BC=27 32 50/5"			5.8	105					
45			**Santiago Formation** **Sandy CLAY (SC)**: fine grained, low to medium plasticity fines, gray, moist, hard, moderately cemented		BC=50/5"									
40	20		The exploration was terminated at approximately 19 ft. below ground surface. The exploration was backfilled with auger cuttings on September 10, 2012.											
35	25													
30	30													

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	129452
DRAWN BY:	CL
CHECKED BY:	KC
DATE:	9/28/2012
REVISED:	9/28/2012

BORING LOG B-4

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

A-6

PAGE: 1 of 1

BORING LOG B-5

Date Begin - End:	9/10/12	**Drill Company:**	Scott's Drilling		
Logged By:	E. Koprulu	**Drill Crew:**			
Hor.-Vert. Datum:	NAD83	**Drill Equipment:**	Ingersoll A-300	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Angle from Vert.:	0 degrees	**Exploration Method:**	Hollow Stem Auger		
Weather:	Sunny	**Auger Diameter:**	8 in.		

FIELD EXPLORATION

Latitude: 33.14014° N
Longitude: -117.32953° W
Approximate Surface Elevation (ft): 42.0

Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Sample Type	Blow Counts(BC)= Uncorr. blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
40	0			BC=13 13 12									
	5			BC=3 5 9							65	48	
35													
	10			BC=4 14 21									
30													
	15			BC=12 21 35									
25													
				BC=16 26 35		SM				49			Direct Shear
	20												

Topsoil
Clayey SAND (SC): fine to coarse grained, non-plastic fines, dark brown, moist, loose to medium dense

Alluvium
Lean CLAY (CL): fine grained, low to medium plasticity fines, gray, moist, soft, trace sand

Silty SAND (SM): fine to medium grained, non-plastic fines, dark gray, moist, medium dense, micaceous

Santiago Formation
Sandy CLAY (SC): fine grained, low plasticity fines, gray, moist, firm to hard

low to medium plasticity fines, hard, weakly cemented

The exploration was terminated at approximately 20 ft. below ground surface. The exploration was backfilled with auger cuttings on September 10, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	129452
DRAWN BY:	CL
CHECKED BY:	KC
DATE:	9/28/2012
REVISED:	9/28/2012

BORING LOG B-5

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE
A-7
PAGE: 1 of 1

Date Begin - End:	9/10/12	**Drill Company:**	Scott's Drilling	**BORING LOG B-6**	
Logged By:	E. Koprulu	**Drill Crew:**			
Hor.-Vert. Datum:	NAD83	**Drill Equipment:**	Ingersoll A-300	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Angle from Vert.:	0 degrees	**Exploration Method:**	Hollow Stem Auger		
Weather:	Sunny	**Auger Diameter:**	8 in.		

FIELD EXPLORATION

Latitude: 33.139577° N
Longitude: -117.328375° W
Approximate Surface Elevation (ft): 63.0

Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Description	Sample Type	Blow Counts(BC)= Uncorr. blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
60	0		**Topsoil** **Silty SAND (SM)**: fine to medium grained, non-plastic fines, dark brown, moist, loose											
			Terrace Deposits **Silty SAND (SM)**: fine to coarse grained, non-plastic fines, reddish brown, moist, medium dense		BC=12 15 18			4.5	113					
55	5		dense, micaceous		BC=10 8 32									
					BC=10 18 32									
50	10		**Santiago Formation** **Silty SAND (SM)**: fine to coarse grained, non-plastic fines, light brown to olive, moist, medium dense											
	15				BC=11 18 27									
45			**Poorly-Graded SAND to Silty Sand (SP-SM)**: fine to coarse grained, non-plastic fines, light gray, moist, dense, micaceous											
			Lean CLAY (CL): low plasticity fines, dark gray, moist		BC=16 35 50/2"									
40	20		**Silty SAND (SM)**: fine to coarse grained, non-plastic fines, brownish gray, moist, very dense, predominately coarse grained, micaceous											
	25													
35														
	30													
30														

The exploration was terminated at approximately 20 ft. below ground surface. The exploration was backfilled with auger cuttings on September 10, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

KLEINFELDER Bright People. Right Solutions.	PROJECT NO.: 129452 DRAWN BY: CL CHECKED BY: KC DATE: 9/28/2012 REVISED: 9/28/2012	BORING LOG B-6 48-Acre Parcel 8 Interstate 5 and Cannon Road Carlsbad, California	PLATE A-8 PAGE: 1 of 1

Date Begin - End:	9/11/12	**Drill Company:**	Scott's Drilling	**BORING LOG B-7**	
Logged By:	E. Koprulu	**Drill Crew:**			
Hor.-Vert. Datum:	NAD83	**Drill Equipment:**	Ingersoll A-300	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Angle from Vert.:	0 degrees	**Exploration Method:**	Hollow Stem Auger		
Weather:	Sunny	**Auger Diameter:**	8 in.		

FIELD EXPLORATION

Latitude: 33.13709° N
Longitude: -117.33° W
Approximate Surface Elevation (ft): 62.0

Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Description	Sample Type	Blow Counts(BC)= Uncorr. blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
60			**Topsoil** **Silty SAND (SM)**: fine grained, non-plastic fines, dark brown, moist, loose											
			Terrace Deposits **Clayey SAND (SC)**: fine to medium grained, low plasticity fines, reddish brown, moist, dense to very dense		BC=18 40 50/5"		SC	5.5	132		27			
55	5		becomes fine to coarse grained		BC=27 50									
			Poorly-Graded SAND (SP): fine to coarse grained, non-plastic fines, grayish brown, moist, dense, micaceous, friable		BC=15 23 27									
50	10													
			Poorly-Graded SAND to Silty Sand (SP-SM): fine to coarse grained, non-plastic fines, gray, moist, very dense, predominately fine to medium grained, micaceous, friable		BC=16 27 45									
45	15		coarser grained, non-plastic fines, wet, dense		BC=21 23 27									
	20		**Santiago Formation** **CLAY to Sandy Clay (CL)**: medium plasticity fines, dark gray, moist, hard		BC=7 8 12									
40														
	25													
35														
	30													
30														

The exploration was terminated at approximately 21.5 ft. below ground surface. The exploration was backfilled with auger cuttings on September 11, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	129452
DRAWN BY:	CL
CHECKED BY:	KC
DATE:	9/28/2012
REVISED:	9/28/2012

BORING LOG B-7

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

A-9

PAGE: 1 of 1

Date Begin - End:	9/11/12	**Drill Company:**	Scott's Drilling	**BORING LOG B-8**	
Logged By:	E. Koprulu	**Drill Crew:**			
Hor.-Vert. Datum:	NAD83	**Drill Equipment:**	Ingersoll A-300	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Angle from Vert.:	0 degrees	**Exploration Method:**	Hollow Stem Auger		
Weather:	Sunny	**Auger Diameter:**	8 in.		

FIELD EXPLORATION

Latitude: 33.13699° N
Longitude: -117.32877° W
Approximate Surface Elevation (ft): 63.0

Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Sample Type	Blow Counts(BC)= Uncorr. blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
60	0												**Topsoil** **Silty SAND (SM)**: fine grained, non-plastic fines, dark brown, moist, loose
				BC=24 29 33			7.6	138					**Terrace Deposits** **Clayey SAND (SC)**: fine to coarse grained, low plasticity fines, reddish brown, moist, dense to very dense
55	5			BC=18 19 24			7.5	132					
													Silty SAND (SM): fine to coarse grained, non-plastic fines, reddish brown, moist, dense, predominately coarse grained, friable
50	10			BC=14 19 28									
													moist to wet, very dense, very friable
45	15			BC=50/5"									
													Santiago Formation **Sandy CLAY (CL)**: fine grained, medium plasticity fines, gray, wet, hard
	20			BC=10 18 21									
40	25												
35	30												
30													

The exploration was terminated at approximately 20 ft. below ground surface. The exploration was backfilled with auger cuttings on September 11, 2012.

GROUNDWATER LEVEL INFORMATION:
▽ Groundwater was observed at approximately 17.5 ft. below ground surface during drilling.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	129452
DRAWN BY:	CL
CHECKED BY:	KC
DATE:	9/28/2012
REVISED:	9/28/2012

BORING LOG B-8

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

A-10

PAGE: 1 of 1

Date Begin - End: 9/11/12 **Excavation Co.:** Cut 'N Core

Logged By: E. Koprulu **Excavation Crew:**

Hor.-Vert. Datum: NAD83 **Excavation Equip.:** CAT 430E

Angle from Vert.: 0 degrees **Excav. Dimensions:** 24 in. O.D.

Weather: Sunny

TEST PIT LOG TP-1

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION	Sample Type	LABORATORY RESULTS: USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
			Latitude: 33.13931° N Longitude: -117.32903° W Approximate Surface Elevation (ft): 63.0 Surface Condition: Bare Earth									
60	0		**Topsoil** **Silty SAND (SM)**: fine grained, dark brown, moist (upper 4-5 inches dry), debris									
			Terrace Deposits **Clayey SAND (SC)**: fine to coarse grained, reddish brown, moist									
55	5		**Silty SAND (SM)**: fine to coarse grained, light reddish brown, moist, predominately coarse grained some rounded gravel increase in gravel content									
	10		**Poorly-Graded SAND (SP)**: fine to coarse grained, light brown to olive, moist									
50	15											
45	20											
40	25											
35												

The exploration was terminated at approximately 10.5 ft. below ground surface. The exploration was backfilled with excavated material on September 11, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.
There was no shoring used for the test pit exploration.

KLEINFELDER
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PROJECT NO.:	129452
DRAWN BY:	CL
CHECKED BY:	KC
DATE:	9/28/2012
REVISED:	9/28/2012

TEST PIT LOG TP-1

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

A-11

PAGE: 1 of 1

gINT FILE: C:\users\cylopez\desktop\gint\carlsbad.gpj R:KLF_STANDARD_GINT_LIBRARY_SR.1.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 9/11/12 **Excavation Co.:** Cut 'N Core

Logged By: E. Koprulu **Excavation Crew:**

Hor.-Vert. Datum: NAD83 **Excavation Equip.:** CAT 430E

Angle from Vert.: 0 degrees **Excav. Dimensions:** 24 in. O.D.

Weather: Sunny

TEST PIT LOG TP-2

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION	Sample Type	LABORATORY RESULTS: USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
			Latitude: 33.13818° N Longitude: -117.32842° W Approximate Surface Elevation (ft): 67.0 Surface Condition: Bare Earth									
65	0		**Topsoil** **Clayey SAND (SC)**: fine grained, dark brown, moist (upper 2 inches dry)									
			Terrace Deposits **Clayey SAND (SC)**: fine to medium grained, reddish brown, moist									
	5											
60			**Silty SAND (SM)**: fine to coarse grained, reddish brown, moist, predominately coarse grained									
	10											
55												
	15											
50												
	20											
45												
	25											
40												

The exploration was terminated at approximately 8.5 ft. below ground surface. The exploration was backfilled with excavated material on September 11, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.
There was no shoring used for the test pit exploration.

KLEINFELDER
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PROJECT NO.:	129452
DRAWN BY:	CL
CHECKED BY:	KC
DATE:	9/28/2012
REVISED:	9/28/2012

TEST PIT LOG TP-2

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

A-12

PAGE: 1 of 1

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TEST PIT LOG TP-3

Date Begin - End:	9/11/12	**Excavation Co.:**	Cut 'N Core
Logged By:	E. Koprulu	**Excavation Crew:**	
Hor.-Vert. Datum:	NAD83	**Excavation Equip.:**	CAT 430E
Angle from Vert.:	0 degrees	**Excav. Dimensions:**	24 in. O.D.
Weather:	Sunny		

FIELD EXPLORATION

Latitude: 33.13828° N
Longitude: -117.32767° W
Approximate Surface Elevation (ft): 69.0

Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Sample Type	USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
65	5										
60	10										
55	15										
50	20										
45	25										
40											

Topsoil
Silty SAND (SM): fine grained, light brown to olive brown, dry, some roots

Silty SAND with Gravel (SM): fine to coarse grained, light gray, moist, loose

Colluvium
Clayey SAND to Silty Sand (SC-SM): fine grained, dark brown, moist, debris, 3 to 15 inch thick lenses of reddish brown sand

Terrace Deposits
Clayey SAND to Silty Sand (SC-SM): fine to medium grained, reddish brown, moist

Poorly-Graded SAND with Silt (SP-SM)

The exploration was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with excavated material on September 11, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.
There was no shoring used for the test pit exploration.

gINT FILE: C:\users\cylopez\desktop\gint\carlsbad.gpj R:KLF_STANDARD_GINT_LIBRARY_SR.1.GLB [KLF_BORING/TEST PIT SOIL LOG]

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PROJECT NO.:	129452
DRAWN BY:	CL
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DATE:	9/28/2012
REVISED:	9/28/2012

TEST PIT LOG TP-3

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

A-13

PAGE: 1 of 1

Date Begin - End:	9/11/12	**Excavation Co.:**	Cut 'N Core	**TEST PIT LOG TP-4**
Logged By:	E. Koprulu	**Excavation Crew:**		
Hor.-Vert. Datum:	NAD83	**Excavation Equip.:**	CAT 430E	
Angle from Vert.:	0 degrees	**Excav. Dimensions:**	24 in. O.D.	
Weather:	Sunny			

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION	Sample Type	LABORATORY RESULTS: USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
			Latitude: 33.13525° N Longitude: -117.32849° W Approximate Surface Elevation (ft): 65.0 Surface Condition: Bare Earth									
			Topsoil **Silty SAND (SM)**: fine to medium grained, dark brown, moist (upper 3 inches dry), some roots, debris									
			Terrace Deposite **Clayey SAND (SC)**: fine to coarse grained, reddish brown, moist									
60	5		**Silty SAND (SM)**: fine to coarse grained, reddish brown, moist, predominately coarse grained, friable									
55	10											
50	15											
45	20											
40	25											

The exploration was terminated at approximately 9 ft. below ground surface. The exploration was backfilled with excavated material on September 11, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.
There was no shoring used for the test pit exploration.

KLEINFELDER
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PROJECT NO.:	129452
DRAWN BY:	CL
CHECKED BY:	KC
DATE:	9/28/2012
REVISED:	9/28/2012

TEST PIT LOG TP-4

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

A-14

PAGE: 1 of 1

Date Begin - End:	9/11/12	**Excavation Co.:**	Cut 'N Core	**TEST PIT LOG TP-5**
Logged By:	E. Koprulu	**Excavation Crew:**		
Hor.-Vert. Datum:	NAD83	**Excavation Equip.:**	CAT 430E	
Angle from Vert.:	0 degrees	**Excav. Dimensions:**	24 in. O.D.	
Weather:	Sunny			

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION	Sample Type	LABORATORY RESULTS: USCS Symbol	Water Content (%)	Dry Density (pcf)	Passing No.4 Sieve (%)	Passing #200 Sieve (%)	Liquid Limit (NV=No Value)	Plasticity Index (NP=No Plasticity)	Other Tests/ Remarks
			Latitude: 33.13593° N Longitude: -117.32661° W Approximate Surface Elevation (ft): 79.0 Surface Condition: Bare Earth									
75	5		**Topsoil** **Silty SAND (SM)**: fine grained, dark brown, dry to moist, feels hard due to dry conditions									
			Terrace Deposite **Clayey SAND (SC)**: fine to medium grained, reddish brown, moist, intact cohesive pieces									
			Silty SAND (SM): fine to coarse grained, reddish brown to light brown, moist									
70	10											
65	15											
60	20											
55	25											
50												

The exploration was terminated at approximately 8.5 ft. below ground surface. The exploration was backfilled with excavated material on September 11, 2012.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during excavation or after completion.
GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.
There was no shoring used for the test pit exploration.

KLEINFELDER
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PROJECT NO.:	129452
DRAWN BY:	CL
CHECKED BY:	KC
DATE:	9/28/2012
REVISED:	9/28/2012

TEST PIT LOG TP-5

48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE
A-15
PAGE: 1 of 1

gINT FILE: C:\users\cylopez\desktop\gint\carlsbad.gpj R:KLF_STANDARD_GINT_LIBRARY_SR.1.GLB [KLF_BORING/TEST PIT SOIL LOG]

APPENDIX B

LABORATORY TESTRESULTS

APPENDIX B
LABORATORY TEST RESULTS

GENERAL

Laboratory tests were performed on selected, representative samples as an aid in classifying the soils and to evaluate the condition of the existing soils and physical properties of the soils that may affect foundation design and construction procedures. A description of our laboratory testing program is presented below.

CLASSIFICATION

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the Boring Log and Test Pit excavation sheets in Appendix A.

MOISTURE CONTENT AND DRY UNIT WEIGHT

Natural moisture content and dry unit weight tests were performed on eleven drive samples collected from the borings in accordance with ASTM D 2216 and D 2937, respectively. The results of these tests are presented on the Logs of Borings in Appendix A.

SIEVE ANALYSIS

Three sieve analyses were performed on representative samples of the materials encountered at the site to evaluate the gradation characteristics of the soil and to aid in classification. The test was performed in general accordance with ASTM Test Method D 422. The results of the test are presented on Plates B1 through B3. An additional sample was washed on the #200 sieve to evaluate the percentage of fines. The results of the wash test is presented on the Logs of Borings in Appendix A

ATTERBERG LIMITS TEST

Atterberg limits test consist of the evaluation of liquid limit, plastic limit, and plasticity index. The test was used to classify the plasticity of the materials and was performed in

general accordance with ASTM Standard Test Method D-4318. The results of the tests are presented on Plate B4.

DIRECT SHEAR TEST

Two direct shear tests were performed on inundated soil samples to evaluate the shear strength. The soil sample were tested in a saturated state, under three different normal pressures, and in general accordance with ASTM Test Method D3080. The direct shear tests were performed at displacement rates that approximate undrained loading conditions. The test results are presented on Plate B5 and B6.

R-VALUE TEST

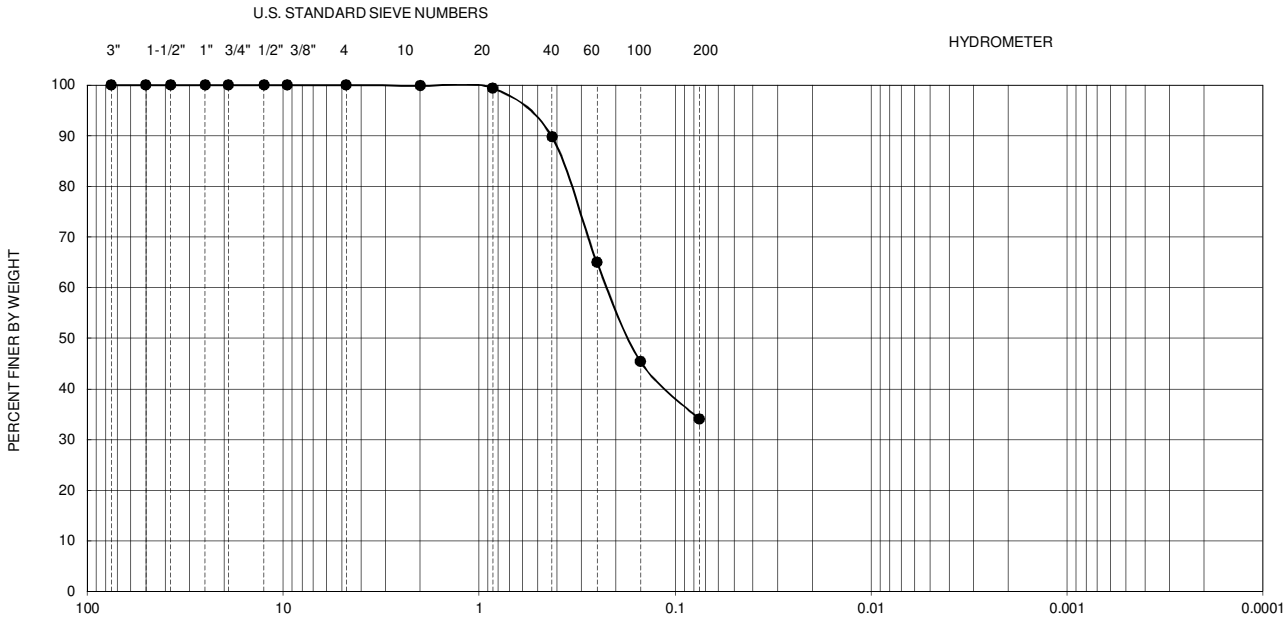
One resistance value (R-value) tests was performed on a bulk soil sample to evaluate pavement support characteristics of the near-surface onsite soils. R-value testing was performed in accordance with ASTM Test Method D-2844. The results are presented in Table B1 below and on the Logs of Borings in Appendix A.

Table B3
Resistance Value (R-Value) Test Results

Boring	Depth (ft)	Soil Type	R-Value
B-1	0.5 – 2.5	Clayey Sand (SC)	37

Date Tested: **9/25/2012**

USCS	GRAVEL		SAND			FINES	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay



Boring No.	Sample No.	Depth (ft)	Passing 200 (%)	USCS Classification
B-1	1	0.5-2.5	34.0	SC

Sample Description	Brown Clayey Sand

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

KLEINFELDER
Bright People. Right Solutions.

Checked by:	KC	Tech:	Uly
Project No.	129452	Date:	3-Oct-12

GRADATION TEST RESULTS

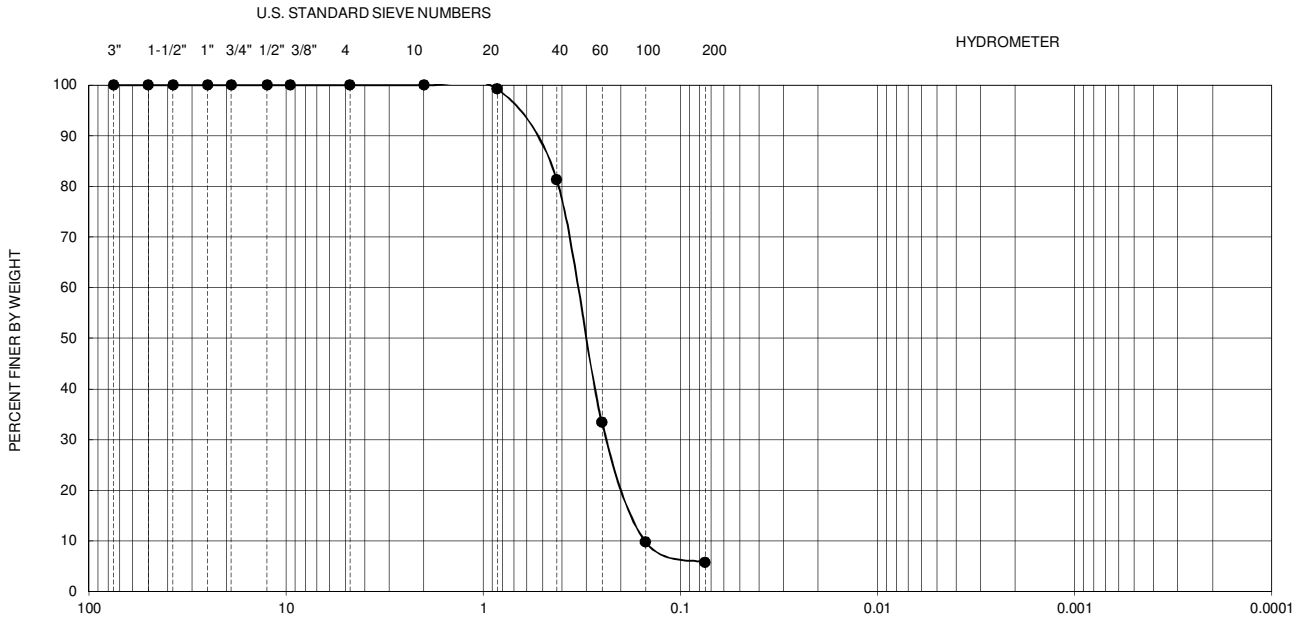
48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

B1

Date Tested: **9/25/2012**

USCS	GRAVEL		SAND			FINES	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay



Boring No.	Sample No.	Depth (ft)	Passing 200 (%)	USCS Classification
B-2	3	10'-11.5'	5.7	SP

Sample Description	Light Brownish Gray Poorly Graded Sand

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

KLEINFELDER
Bright People. Right Solutions.

Checked by:	KC	Tech:	Uly
Project No.	129452	Date:	3-Oct-12

GRADATION TEST RESULTS

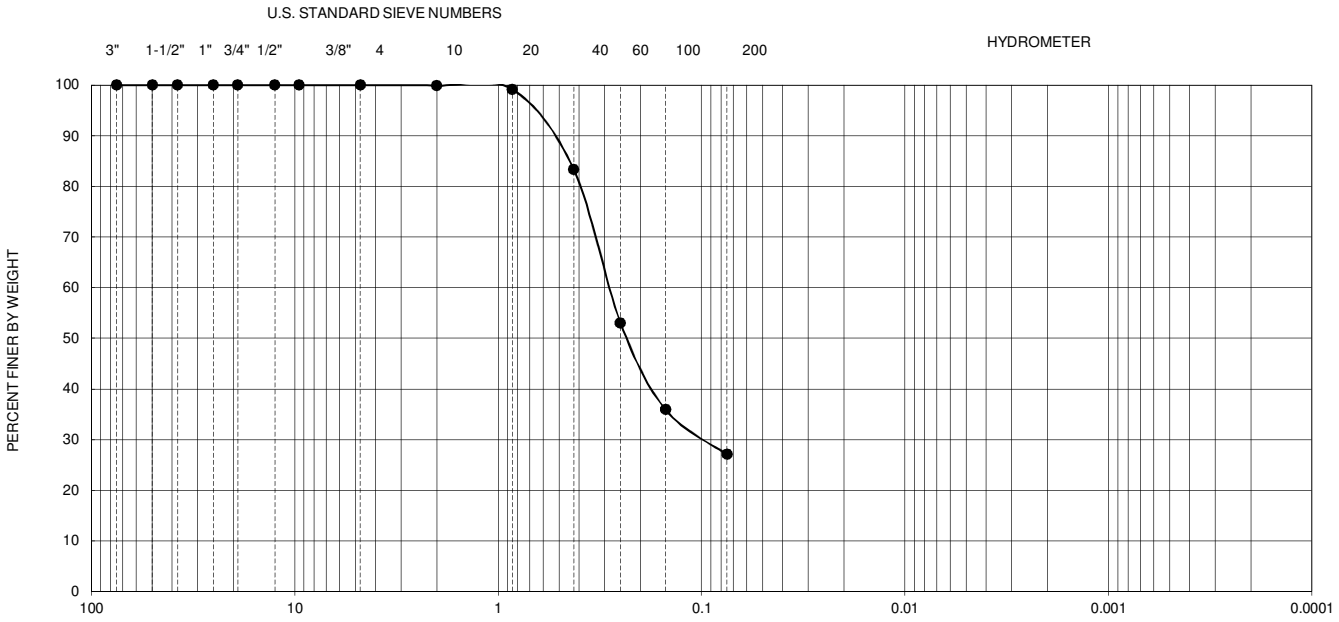
48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

B2

Date Tested: **9/25/2012**

USCS	GRAVEL		SAND			FINES	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay



Boring No.	Sample No.	Depth (ft)	Passing 200 (%)	USCS Classification
B-7	1	2-3.5	27.1	SM

Sample Description	Brown Clayey Sand

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

KLEINFELDER
Bright People. Right Solutions.

Checked by:	KC	Tech:	Uly
Project No.	129452	Date:	3-Oct-12

GRADATION TEST RESULTS

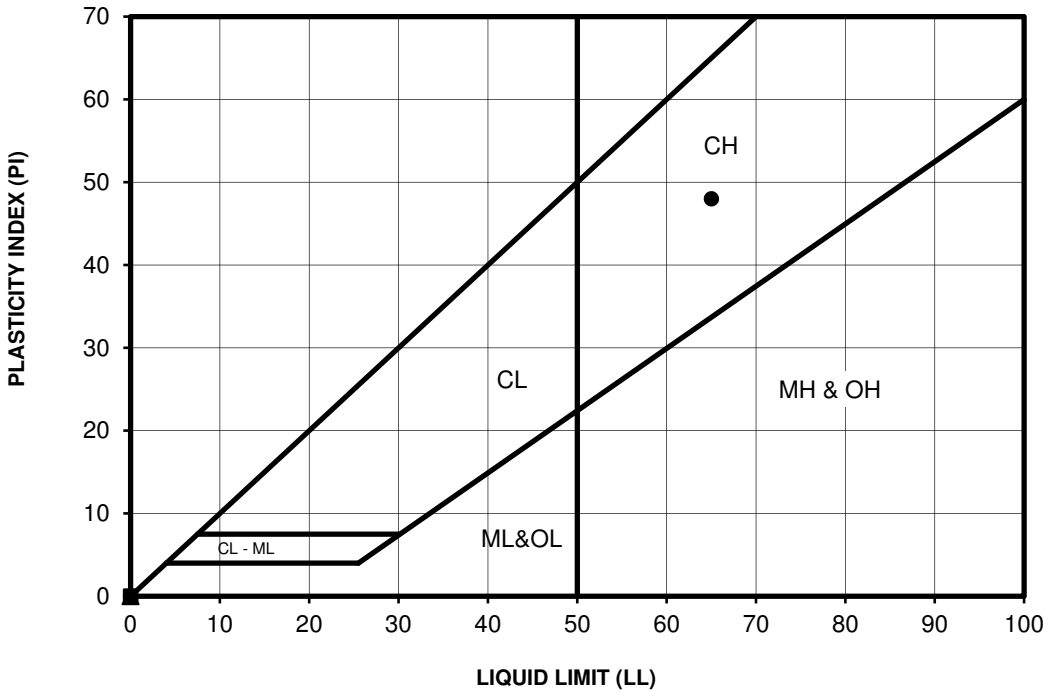
48-Acre Parcel 8
Interstate 5 and Cannon Road
Carlsbad, California

PLATE

B3

Date Tested : 9/25/2012

SYMBOL	SAMPLE NAME	DEPTH (ft)	LL	PL	PI	USCS CLASSIFICATION (Minus No. 40 Sieve Fraction)	USCS (Entire Sample)
●	B-5/2	5-6.5'	65	17	48	CH	CH



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

KLEINFELDER
Bright People. Right Solutions.

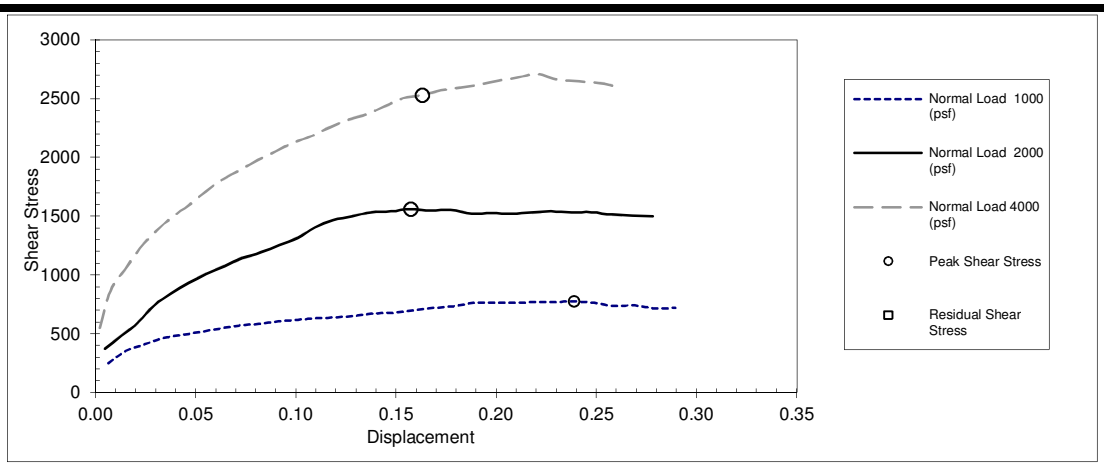
CHECKED BY: KC	TECH: Uly
PROJECT NO: 129452	3-Oct-12

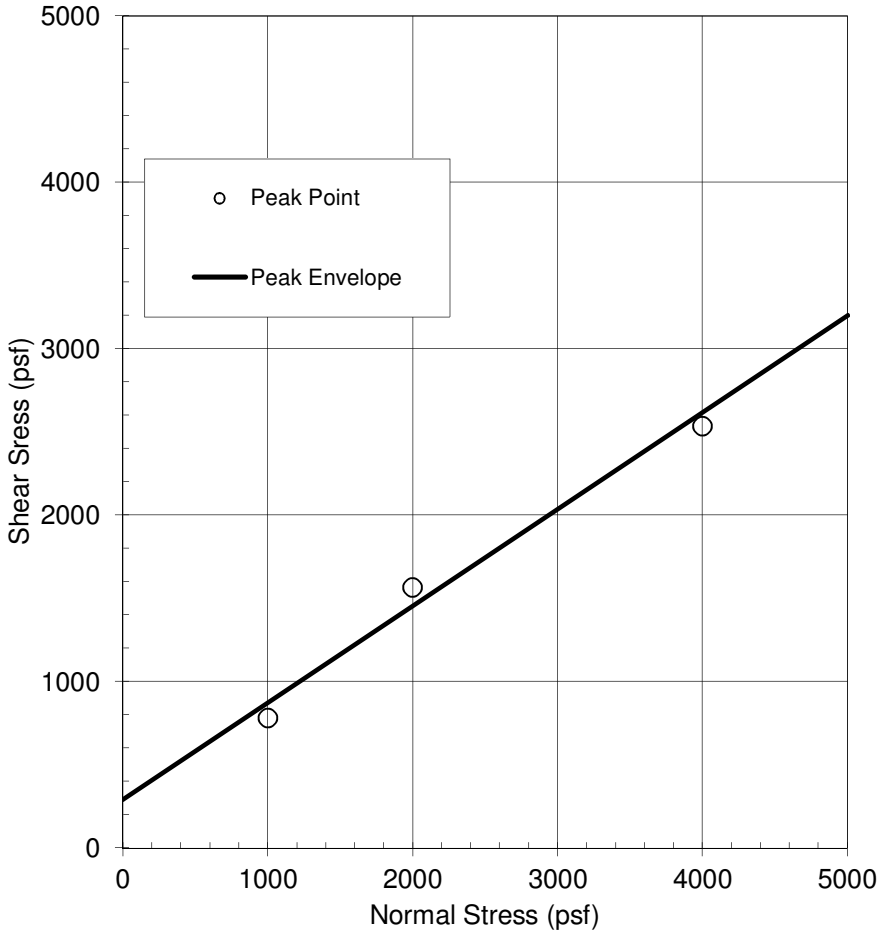
ATTERBERG LIMITS TEST RESULTS

48-Acre Parcel 8
Interstate 5 and Cannon Rd
Carlsbad, California

PLATE

B4

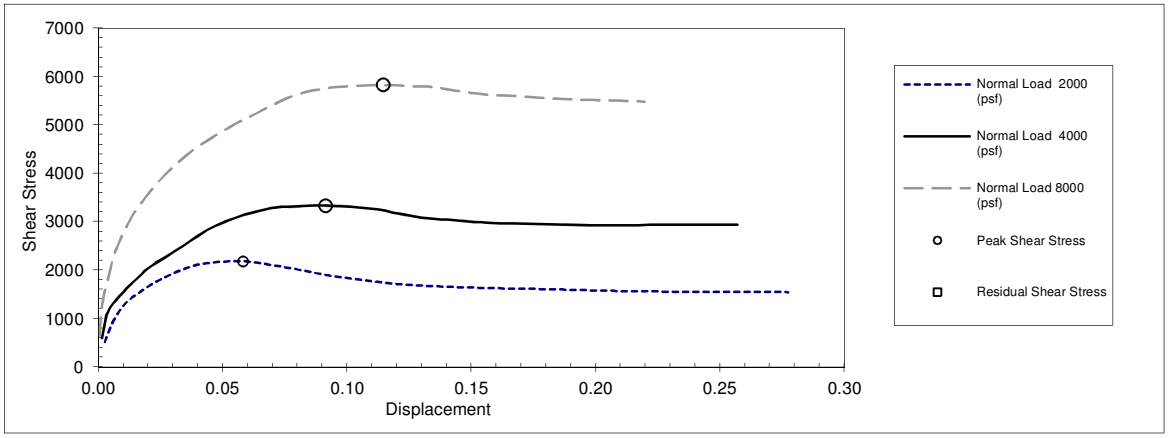


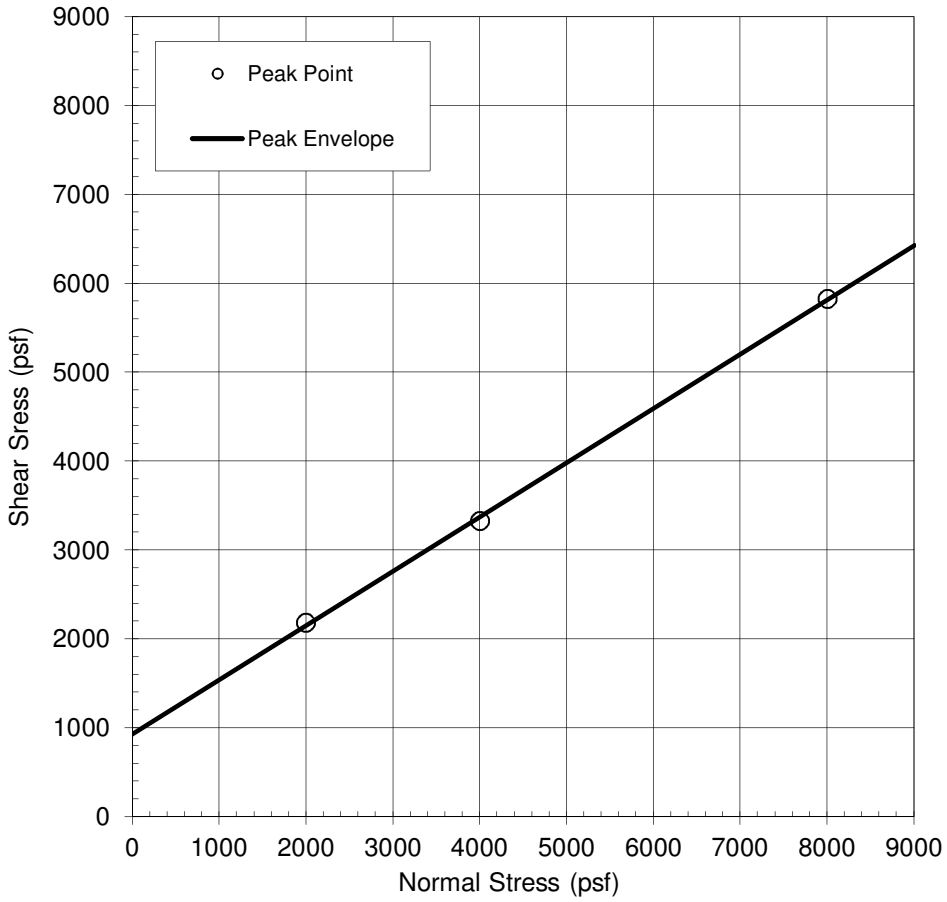


Strain Rate: 0.0118 inch/min				Interpreted Shear Strength	
Date Tested: 9/21/2012				Peak	
Boring No.	Sample No.	Depth (ft)	UCSC	Cohesion (psf)	Friction Angle (deg)
B-3	2	3-4.5	SM	294	30.2

Sample description: Brown Silty Sand

KLEINFELDER Bright People. Right Solutions.	**Direct Shear Test Results (ASTM D 3080)**	PLATE
Checked KC / Tech : Uly	**48-Acre Parcel 8**	
Project # 129452 / 3-Oct-12	**Interstate 5 and Cannon Road**	**B5**
	Carlsbad, California	





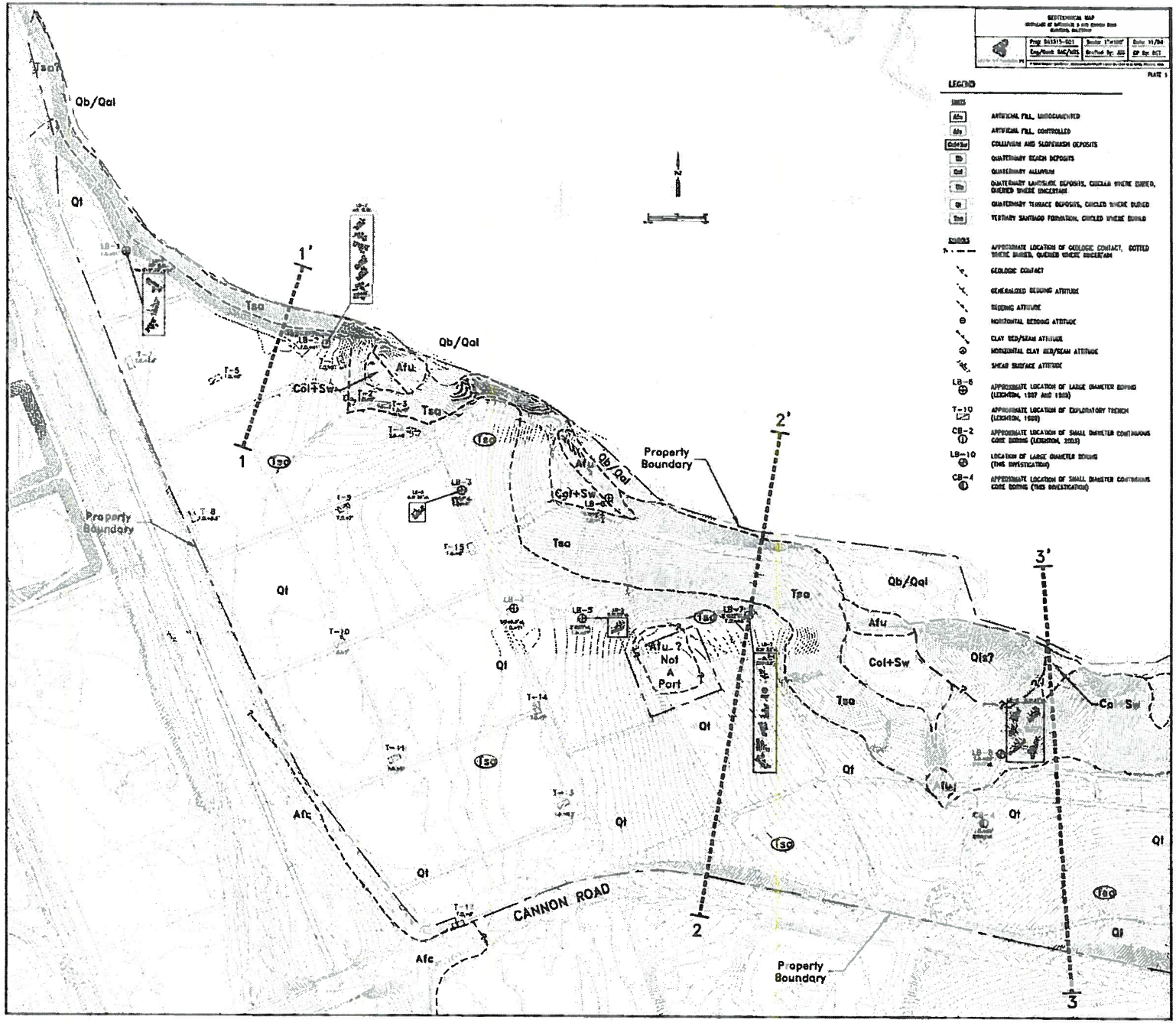
Strain Rate: 0.0118 inch/min				Interpreted Shear Strength	
Date Tested: 9/25/2012				Peak	
Boring No.	Sample No	Depth	UCSC	Cohesion (psf)	Friction Angle (deg)
B-5	5	18.5'-20'	SC	935	31.4

Sample description: Light Gray Clayey Sand

KLEINFELDER Bright People. Right Solutions.		Direct Shear Test Results (ASTM D 3080)	PLATE
Checked By: KC	Tech : Uly	48-Acre Parcel 8 Interstate 5 and Cannon Road Carlsbad, California	B6
Project # 129452	3-Oct-12		

APPENDIX C

PORTIONS OF 2004 LEIGHTON REPORT


Qb/Qal
Qt
Tsa
Afu
Col+Sw
Afc
Property Boundary
CANNON ROAD
1
1'
2
2'
3
3'
Afu - ? Not A Part - ?
Qfs?
Ca Sw
LEGEND
PLATE 3

GEOTECHNICAL BORING LOG KEY

Date _____ Sheet 1 of 1

Project KEY TO BORING LOG GRAPHICS Project No. _____

Drilling Co. _____ Type of Rig _____

Hole Diameter _____ Drive Weight _____ Drop _____"

Elevation Top of Hole _____' Location _____

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class (U.S.C.S.)	DESCRIPTION Logged By _____ Sampled By _____	Type of Tests
	0								Asphaltic concrete	
									Portland cement concrete	
								CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay	
								CH		
								OL		
	5							ML	Inorganic silt; clayey silt with low plasticity	
								MH	Inorganic silt; diatomaceous fine sandy or silty soils; elastic silt	
								ML-CL	Clayey silt to silty clay	
								GW	Well-graded gravel; gravel-sand mixture, little or no fines	
								GP	Poorly graded gravel; gravel-sand mixture, little or no fines	
	10							GM		
								GC	Clayey gravel; gravel-sand-clay mixture	
								SW	Well-graded sand; gravelly sand, little or no fines	
								SP	Poorly graded sand; gravelly sand, little or no fines	
								SM	Silty sand; poorly graded sand-silt mixture	
	15							SC		
									Bedrock	
▽									Ground water encountered at time of drilling	
	20			B-1					Bulk Sample	
				C-1					Core Sample	
				G-1					Grab Sample	
				R-1					Modified California Sampler (3" O.D., 2.5 I.D.)	
				SH-1					Shelby Tube Sampler (3" O.D.)	
	25			S-1					Standard Penetration Test SPT (Sampler (2" O.D., 1.4" I.D.)	
	30									

SAMPLE TYPES:

- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

TYPE OF TESTS:

- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- CU TRIAXIAL SHEAR
- EI EXPANSION INDEX
- RV R-VALUE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG

DATE January 28, 1987 DRILL HOLE No. B-1 SHEET 1 OF 2

PROJECT Phase One/Carlsbad PROJECT No. 8870059-01

DRILLING CO. Gallagher Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 30" DRIVE WEIGHT 3,087# to 26', 2,000# to 45' DROP 12 IN.

ELEVATION TOP OF HOLE ±57' REF. OR DATUM See Geotechnical Map

LOGGED BY RKW/RLW

SAMPLED BY RKW

Depth Feet	Graphic Log (W–E)	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0							SM	TOPSOIL: Dark brown, moist, loose, silty, fine to medium grained sand; slightly clayey; occasional pieces of plastic and shell fragments; roots and rootlets; sharp, irregular, lower contact
							SM	TERRACE DEPOSITS: Orangish medium to dark brown, moist to very moist, dense, silty, fine to medium grained sand; few subrounded, coarse sand to gravel; friable; iron oxide staining; pockets of topsoil to 2 feet; homogeneous below 2 feet
5			1	push/ 1 10"	109.5	8.2		@ 5.5' Gradational change to less oxidized terrace deposits; grayish medium brown, damp to moist, medium dense, silty, fine to medium grained sand; slight iron oxide staining; slightly micaceous; abundant dark mineral sand grains; very friable; near vertical veins of light brown, silty sand
								@ 7.4' Contins pockets of orange-brown, silty sand (up to 6 inches)
10			2	2	108.7	6.2		@ 9.5' Equal mixing of orange-brown and grayish brown, silty sand pockets and near vertical veins (up to 6 inches in width) of orange-brown, silty sand
							SM/SW	@ 13' Light to medium brown, moist, dense, slightly silty, fine to coarse grained sand; very friable; micaceous; scattered, subrounded gravel; contains discontinuous layers of very coarse sand (up to 2 - 4 inches in thickness); becomes coarser with depth; slightly bedded (possible cross beds with beds dipping to the west approximately 10 to 20 degrees); abundant iron oxide staining; siltstone rip-up clasts; sharp lower contact
15			3	4	101.3	3.3		
			①				SW	SANTIAGO FORMATION: Light gray, moist, dense, silty, fine to coarse grained sandstone; massive; micaceous; slightly friable; minor seepage above lower contact, iron oxidation along contact, very sharp lower contact
20		GC: N36°E 9°NE						@ 19.2' Greenish light gray, moist, dense, very silty, fine grained sandstone; massive; iron oxide staining along upper contact (1/8 to 1/4 inch thick)
								@ 20.5' Color changes to light brown-gray; discontinuous iron oxide staining along contact on west side (1/2 to 1 inch thick); slightly micaceous; layers of less friable, silty sand (2 to 6 inches thick)
			②					@ 23.3' Light to medium gray, moist, dense to very dense, silty, fine to medium grained sandstone; micaceous; appears to be denser and less permeable than sand layer above; minor seepage at upper contact
25				4 6/9"	120.8	11.9		
			③ ④	5 8/6"	118.9	15.4	MH/CL	@ 26.7' Olive-brown, moist, medium stiff, very silty clay stone to very clayey siltstone; randomly oriented shears/parting surfaces (with no preferred direction); micaceous; approximately 6 inches thick
		CS: N18°E 3°SW and N56°W 6°SW					SM	
30								

GEOTECHNICAL BORING LOG

DATE January 28, 1987 DRILL HOLE NO. B-1 SHEET 2 OF 2

PROJECT Phase One/Carlsbad PROJECT NO. 8870059-01

DRILLING CO. Gallagher Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 30" DRIVE WEIGHT 3,087# to 26', 2,000# to 45' DROP 12 IN.

ELEVATION TOP OF HOLE ±57' REF. OR DATUM See Geotechnical Map

LOGGED BY RKW/RLW

SAMPLED BY RKW

Depth Feet	Graphic Log (W E)	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30								SANTIAGO FORMATION (Continued):
								@ 27.3' Light brownish gray, moist, dense to very dense, silty, fine grained sandstone; micaceous; massive; upper contact is well cemented and iron oxide stained
								@ 31.5' Gradational change to silty, fine to coarse grained sandstone
								@ 32' Moisture changes to very moist
								@ 34' Minor seepage on east side of boring
35								@ 35.2' Greenish gray, moist, very dense, silty, fine grained sandstone; gradational upper contact; iron oxidation on lower contact (1/4 to 1/2 inch thick); lower contact appears to be undulating erosional surface
								@ 35.4' Light brownish gray, moist, very dense, silty, fine grained sandstone; massive
40								@ 41' Gradational change to silty, fine to medium grained sandstone; iron oxidation along contact (approximately 1 inch thick)
45								
50								Total Depth = 51 feet Geologically logged to 49 feet Minor seepage at 19, 23, and 34 feet Backfilled 1/28/87
55								
60								

GEOTECHNICAL BORING LOG

DATE January 28, 1987 DRILL HOLE NO. B-2 SHEET 1 OF 2

PROJECT Phase One/Carlsbad PROJECT NO. 8870059-01

DRILLING CO. Gallagher Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 30" DRIVE WEIGHT 3,087# to 26', 2,000# to 45' DROP 12 IN.

ELEVATION TOP OF HOLE ±52' REF. OR DATUM See Geotechnical Map

LOGGED BY RKW/RLW

SAMPLED BY RKW

Depth Feet	Graphic Log (W–E)	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
0							SM	TOPSOIL: Dark brown, moist, loose, silty, fine to medium grained sand; scattered, subrounded, coarse sand to gravel; roots and rootlets; sharp, irregular lower contact
							SM	TERRACE DEPOSITS: Orangish medium to dark brown, moist, silty, fine to medium grained sand; friable; micaceous; scattered, subrounded, coarse sand to gravel; oblong clast of sandstone in west side of boring
							CL	
							SM	
5		J: N36°E 79°NW	① 1	4	98.4	16.5		@ 1.4' Grades to highly weathered claystone; olive-green, very moist, medium stiff, silty claystone; roots (up to 1/4 inch in diameter) and rootlets; calcium carbonate blebs and near vertical stringers; occasional subrounded gravel
								@ 2.3' Gradational change to less weathered claystone; blocky appearance; calcium carbonate along fractures; contains pockets of silty sand
10			② 2	4	122.1	7.2		@ 3.2' Mottled light brownish gray and light gray, damp, dense, silty, fine grained sand; massive; slightly friable; discontinuous, randomly oriented, steeply dipping joints; minor calcium carbonate along joints
								@ 4' Discontinuous (6 to 8 inch diameter) pocket of very friable, slightly silty sand
								@ 6' Discontinuous (4 inch thick) layer of very friable, silty sand
							SM	@ 7.3' Light brownish gray, moist, dense, silty, fine to coarse sand; discontinuous layers of very coarse sand (2 to 4 inches thick); interbedded with sand above in upper 6 inches; slight layering of subrounded gravel; friable
15		CS: N82°E 7°SE and N69°E 4°SE	3	7	116.6	15.4	MH	
							SM	@ 9.2' Grades to an orange-brown, damp, dense, fine to coarse sand; with subrounded gravel to cobble and siltstone clasts (up to 5 inches in diameter); friable
								@ 10.1' Very undulating, 4 to 10 inch thick zone of abundant gravel, cobble, and chunks of weathered, olive-green claystone
20		J: N48°E 62°NW						@ 11' Interbedded zones of coarse grained sand and fine to medium grained sand
								@ 13' 4-inch layer of abundant cobble and claystone chunks; oblong chunk of sandstone (possible rip-up clast); sharp, very irregular erosional lower contact
								SANTIAGO FORMATION: Light brownish gray, moist, dense, silty, fine to medium graines sandstone; massive; slightly micaceous; iron oxidation along upper contact; vertical fractures to 15 feet infilled with orange-brown sand from overlying unit; sand grain sizes increase with depth; sharp, undulating contact
25		J: N56°E 87°NW	③					@ 15' Mottled orange-brown and light brownish gray, moist, dense, very silty, fine grained sandstone
								@ 15.4' 4-inch thick layer of olive-brown, moist, stiff, clayey siltstone; massive; blocky
		B: N71°W 14°SW J: N84°E 83°SE						@ 15.8' Clayseam; paper thin; undulating but dipping to the southeast
30								

505A(11/77)

LEIGHTON & ASSOCIATES

GEOTECHNICAL BORING LOG

DATE January 28, 1987 DRILL HOLE No. B-2 SHEET 2 OF 2

PROJECT Phase One/Carlsbad PROJECT No. 8870059-01

DRILLING CO. Gallagher Drilling TYPE OF RIG Bucket Auger

HOLE DIAMETER 30" DRIVE WEIGHT 3,087# to 26', 2,000# to 45' DROP 12 IN.

ELEVATION TOP OF HOLE ±52' REF. OR DATUM See Geotechnical Map

LOGGED BY RKW/RLW

SAMPLED BY RKW

DEPTH FEET	GRAPHIC LOG (W – E)	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30							SM	SANTIAGO FORMATION (Continued):
								@ 15.9' Light brownish gray to light gray, moist, very dense, silty, fine to medium grained sandstone; massive; iron oxide stained, near horizontal layers and iron staining along upper contact
								@ 22.5' Gradational change to brownish gray, very silty, fine grained sandstone to fine, sandy siltstone; black, manganese, oxide staining along joint, fairly well jointed
35								@ 29' Gradational change to silty, fine grained sandstone
40								Total Depth = 41 feet Geologically logged to 38 feet No ground water encountered Minor caving from 9 to 13 feet Backfilled 1/28/87
45								
50								
55								
60								

GEOTECHNICAL BORING LOG

DATE September 13, 1989 DRILL HOLE NO. B-3 SHEET 1 OF 2

PROJECT Carltas-Rancho Aqua Hedionda-Regional Shopping Center PROJECT NO. 8891551-01

DRILLING CO. San Diego Drilling Company TYPE OF RIG Bucket Auger/E-10

HOLE DIAMETER 30 in. DRIVE WEIGHT 4,113# to 25'; 2981# to 47' DROP 12 IN.

ELEVATION TOP OF HOLE ±61' REF. OR DATUM See Geotechnical Map

LOGGED BY RLW

SAMPLED BY RLW

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0		c:undulating					SM	AGRICULTURAL SOIL/ROAD: Light to medium red-brown, dry to damp, loose to medium dense, silty, fine- to medium-grained sand; moderately disturbed
							SP	TERRACE DEPOSITS: @ 1' Light to medium red-orange-brown, moist, dense, slightly silty, fine- to medium-grained sand; relatively homogeneous with very scattered, rounded pebbles
5							GW	@ 5.5' 2- to 3-inch thick, continuous, well-rounded gravel and cobble layer
							SW	@ 5.8' Orange-brown-red, moist to very moist, dense, fine- to coarse-grained sand; cohesionless; very friable; micaceous; relatively massive; no apparent structure noted
10			① 1	2	Lost Recovery (cohesionless soil)			
		c:erosional gen: N42E/ 4-6NW					SM	@ 12.5' Medium yellow-brown, moist, medium dense, silty, fine-grained sand
		c:erosional						@ 14' 6- to 10-inch thick, continuous, well rounded, sandy, gravel and cobble conglomerate layer
15			2	2	91.6	7.4		SANTIAGO FORMATION: @ 14.5' Tan to yellow, moist, medium dense to dense, silty, fine-grained sand; slightly micaceous; moderately friable; locally stained red-brown by iron oxide; relatively massive
			②					
20			3	4	103.3	10.2		
25								@ 25' Slight increase in moisture content noted with increasing depth
30								

GEOTECHNICAL BORING LOG

DATE September 13, 1989 DRILL HOLE No. B-3 SHEET 2 OF 2

PROJECT Carltas-Rancho Aqua Hedionda-Regional Shopping Center PROJECT No. 8891551-01

DRILLING CO. San Diego Drilling Company TYPE OF RIG Bucket Auger/E-100

HOLE DIAMETER 30 in. DRIVE WEIGHT 4,113# to 25'; 2981# to 47' DROP 12 IN.

ELEVATION TOP OF HOLE ±61' REF. OR DATUM See Geotechnical Map

LOGGED BY RLW

SAMPLED BY RLW

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30			4	5	93.8	7.9	SM	SANTIAGO FORMATION (CONTINUED) Tan to yellow, moist to very moist, medium dense to dense, silty, fine-grained sand; slightly micaceous; moderately friable; locally stained red-brown by iron oxide; relatively massive; increase in moisture content with depth @ 33' Heavy caving; possibly at zone of free water/ground water table; boring considered unsafe to continue down-hole logging @ 35' Evidence of free water noted in cuttings
35						▽		
40			③ 5	2	76.9	45.3	CL	@ 39' Medium to dark gray, very moist, firm, silty clay layer noted in cuttings and drive sample; relatively plastic and potentially compressible; possible perching water above @ 40' Cuttings were noted as similar to those above the clay layer
	TD=41'							
45								Boring Terminated at 41 Feet Due to Caving Ground Water Encountered at 33 Feet Caving Noted Below 33 Feet Backfilled 9/13/89
50								
55								
60								

GEOTECHNICAL BORING LOG

DATE September 13, 1989 DRILL HOLE No. B-4 SHEET 1 OF 1

PROJECT Carltas-Rancho Aqua Hedionda-Regional Shopping Center PROJECT No. 8891551-01

DRILLING CO. San Diego Drilling Company TYPE OF RIG Bucket Auger/E-100

HOLE DIAMETER 30 in. DRIVE WEIGHT 4,113# to 25'; 2981# to 47' DROP 12 IN.

ELEVATION TOP OF HOLE ±68.5' REF. OR DATUM See Geotechnical Map

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE No.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
								LOGGED BY RLW SAMPLED BY RLW
0								**AGRICULTURAL SOIL:** Medium red-brown, moist to very moist, silty, fine- to medium-grained sand; scattered, well-rounded gravel and cobbles; scattered roots and rootlets; fill debris including concrete chunks to 6 inches
5		c:undulating						**TERRACE DEPOSITS:** @ 5' Medium red-brown, very moist, dense, silty, fine- to medium-grained sand; moderately friable; slightly micaceous; massive
10		c:undulating	① 1	2	108.3	8.7		@ 10' Medium orange-red-brown, very moist, dense, fine- to coarse-grained sand; friable; slightly silty; micaceous; massive
15		c:erosional	2	5	102.8	23.1		**SANTIAGO FORMATION:** @ 15' Tan to yellow, very moist to saturated, moderately dense to dense, silty, fine-grained sand; moderately friable
						▽		@ 18' Heavy caving noted @ 19' Flowing ground water
20			② 3	3	93.2	26.7		
		TD=21'						Boring Terminated at 21 Feet Due to Heavy Caving Caving Noted at 18 Feet Standing Ground Water at 19 Feet Geologically Logged to 18 Feet Backfilled 9/13/89
25								
30								

GEOTECHNICAL BORING LOG

DATE September 13, 1989 DRILL HOLE NO. B-5 SHEET 1 OF 1

PROJECT Carltas-Rancho Aqua Hedionda-Regional Shopping Center PROJECT NO. 8891551-01

DRILLING CO. San Diego Drilling Company TYPE OF RIG Bucket Auger/E-100

HOLE DIAMETER 30 in. DRIVE WEIGHT 4,113# to 25'; 2981# to 47' DROP 12 IN.

ELEVATION TOP OF HOLE ±76' REF. OR DATUM See Geotechnical Map

LOGGED BY RLW

SAMPLED BY RLW

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0							SM	AGRICULTURAL SOIL: Medium to dark red-brown, moist, medium dense, silty, fine- to medium-grained sand; scattered gravel
		c:undulating					SM	TERRACE DEPOSITS: @ 2' Medium red-brown, moist, dense, silty, fine- to medium-grained sand; moderately friable; relatively massive; no apparent structure; homogeneous
5								
10		c:erosional					GM	@ 9.5' Medium red-brown, moist to very moist, dense, silty, sandy gravel and cobble conglomerate layer; approximately 25 feet thick; continuous; clasts are well rounded
		c:erosional						
							SM	SANTIAGO FORMATION: @ 12' Tan to yellow, moist to very moist, medium dense to dense, fine- to medium-grained sand; slightly silty; very friable; locally stained red-brown by iron oxide
15		gb:N69E/4NW						@ 15' Faint bedding noted dipping approximately 4 degrees northwest
								@ 19' Slightly more indurated/less friable layer; approximately 12 inches thick
20			① 1	5	95.9	6.5		
25			2	5	102.2	28.3 ▽		@ 25' Heavy caving above standing ground water; boring terminated due to caving @ 26' Standing ground water
		TD=27'						Total Depth = 27 Feet Geologically Logged to 25 Feet Caving Noted at 25 Feet Standing Water Noted at 26 Feet Backfilled 9/13/89
30								

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410

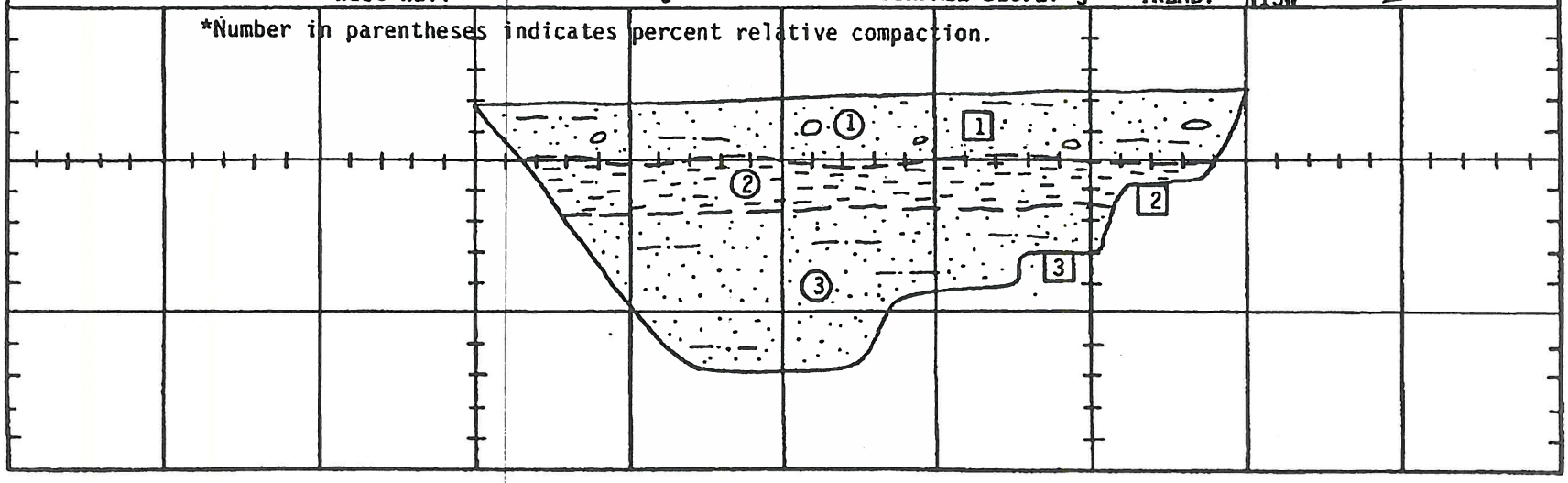
Logged By: RKW
Elevation: ±46'
Location: See Geotechnical Map

TRENCH NO. T-1

GEOLOGIC ATTITUDES	DESCRIPTION (DATE: 1/26/87)	GEOLOGIC UNIT	ENGINEERING PROPERTIES: U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	(1) TOPSOIL: Dark brown, moist to wet, loose to medium dense, slightly silty, fine to medium grained sand; occasional subrounded gravel to fine cobbles; sharp, irregular lower contact	Topsoil	SM	[1]		
	(2) Alluvium: Medium brown, moist, stiff, sandy clay; gradational lower contact; calcium carbonate in gradational zone; pockets of light gray sand; friable	Qal	CL	[2] @ 3'	18.2	114.1 (98)*
	(3) Terrace Deposits: Orangish medium brown, moist, dense, silty, fine to medium grained sand; slightly clayey; scattered pockets of light gray-brown, silty sand; abundant iron oxide staining; massive; homogeneous	Qt	SM	[3] @ 5'	8.6	116.4 (96)
	Total Depth = 9 Feet No Caving; No Ground Water Encountered Backfilled 1/26/87					

GRAPHIC REPRESENTATION West Wall SCALE: 1" = 5' SURFACE SLOPE: 5° TREND: N13W →

*Number in parentheses indicates percent relative compaction.



LOG OF TRENCH NO: T-1

Leighton & Associates

501-A - (3/77)

501-A - (3/77)

Leighton & Associates

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410

Logged By: RKW/BJM
Elevation: ±46'
Location: See Geotechnical Map

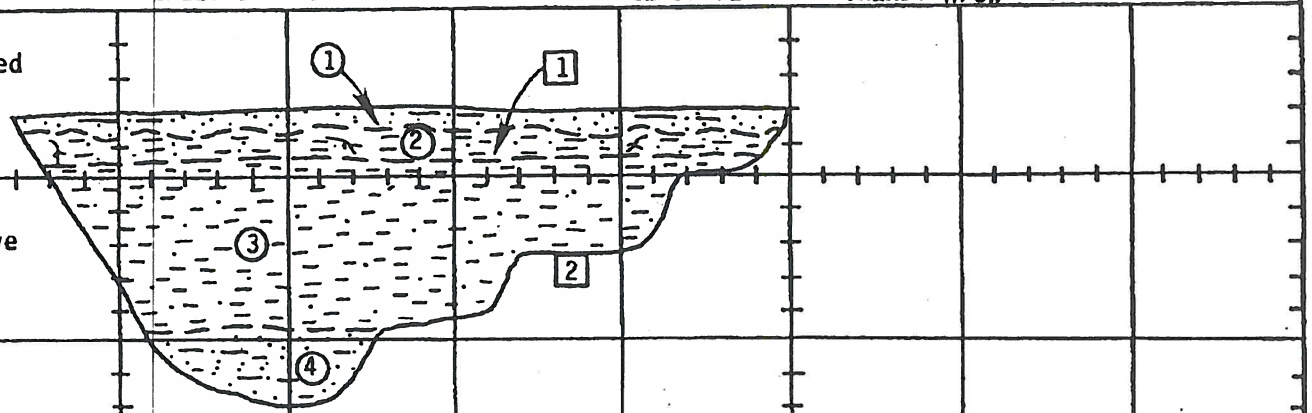
TRENCH NO. T-2

GEOLOGIC ATTITUDES	DATE: 1/26/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	(1) TOPSOIL: Dark brown, moist, loose to medium dense, silty, fine to medium grained sand; scattered organics and plastic; sharp, irregular lower contact	Topsoil	SM			
	(2) ALLUVIUM: Grayish dark brown, moist, stiff, sandy clay; occasional rootlets; appears disturbed; gradational lower contact	Qal	CL	[1]		
	(3) @ 1.5' grayish medium brown, moist, medium stiff, sandy clay; calcium carbonate blebs (up to 1/4 inch in diameter) to 3 feet; dessication cracks up to 1/8 inch wide to 3 feet in depth; gradational lower contact		CL	[2] @ 5'	17.8	90.2 (77)*
	(4) TERRACE DEPOSITS: Orangish medium brown, moist, dense, clayey to silty, fine to medium grained sand; less clayey below 8 feet; iron oxide staining; subrounded gravel and pockets of light gray, clean sand; slightly porous; friable; massive; homogeneous	Qt	SM/SC			

GRAPHIC REPRESENTATION East Wall SCALE: 1" = 5' SURFACE SLOPE: 0° TREND: N73W

Total Depth = 9 Feet
No Ground Water Encountered
No Caving
Backfilled 1/26/87

*Number in parentheses indicates percent relative compaction.



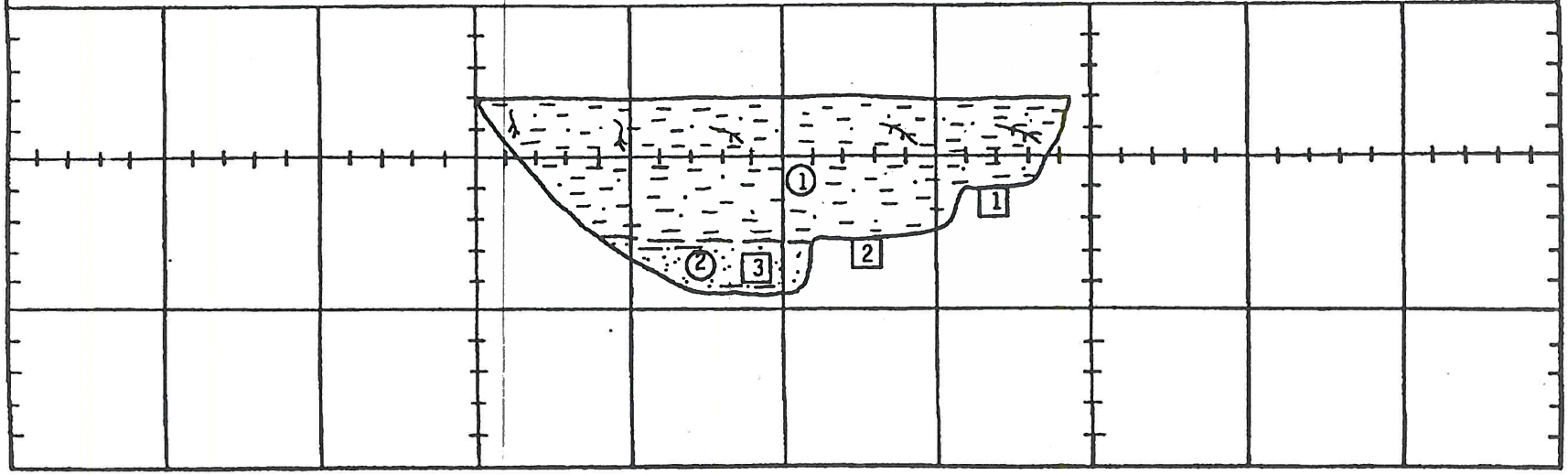
LOG OF TRENCH NO: T-2

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410
Logged By: RKW/BJM
Elevation: ±41'
Location: See Geotechnical Map
TRENCH NO. T-3

GEOLOGIC ATTITUDES	DATE: 1/26/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	(1) ALLUVIUM: Medium brown, moist, stiff to very stiff, sandy clay; roots and rootlets to 2 feet; scattered blebs of decomposed organics; scattered calcium carbonate blebs and stringers to 3 feet (predominantly in upper 1 foot); gradational lower contact	Qal	CL	1 @ 3'	7.7	113.6 (97)*
	(2) TERRACE DEPOSITS: Orangish medium brown, moist, dense, silty, fine to medium grained sand; occasional subrounded gravel to cobble (up to 5 inches in diameter); iron oxide staining; friable; homogeneous; massive	Qt	SM	2 @ 4.5' 3	8.1	113.1 (93)

* Number in parentheses indicates percent relative compaction.
Total Depth = 6 Feet
No Ground Water Encountered
No Caving
Backfilled 1/26/87

GRAPHIC REPRESENTATION South Wall SCALE: 1" = 5' SURFACE SLOPE: 0° TREND: N72W →



LOG OF TRENCH NO: T-3

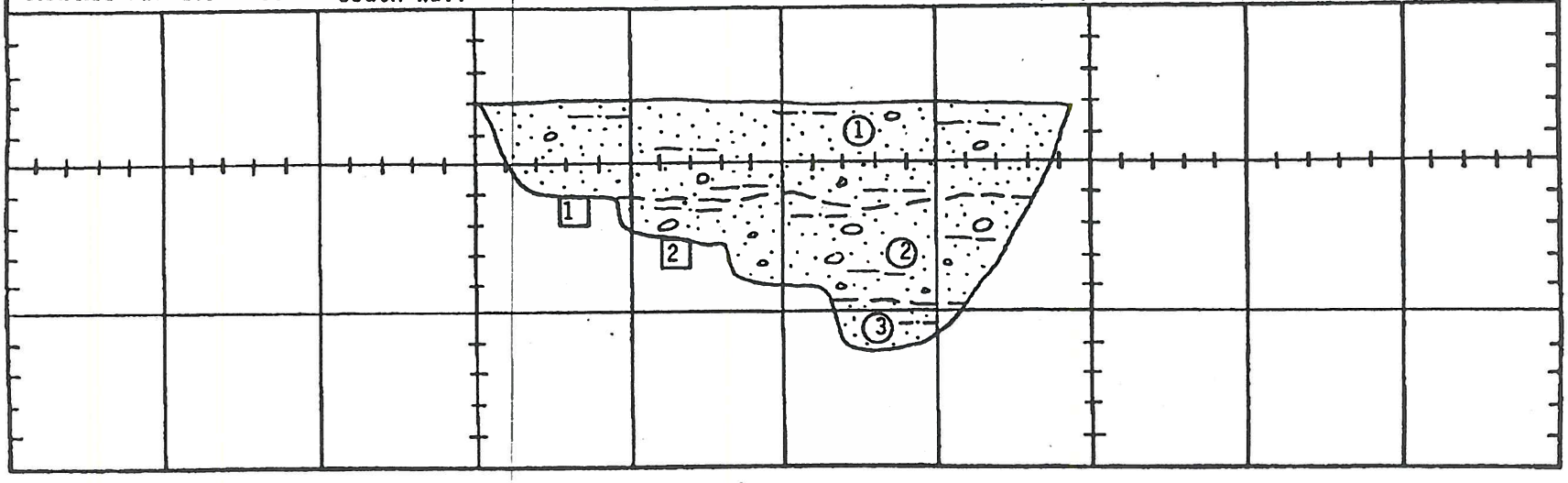
501-A - (3/77)

Leighton & Associates

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410
Logged By: RKW/BJM
Elevation: ±50'
TRENCH NO. T-4
Location: See Geotechnical Map

GEOLOGIC ATTITUDES	DATE: 1/26/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	① TOPSOIL: Dark brown, moist, loose to medium dense, silty, fine to medium grained sand; scattered subrounded gravel; sharp, irregular lower contact	Topsoil	SM			
	② TERRACE DEPOSITS: Orangish medium brown, moist to very moist, dense, silty, fine to medium grained sand; abundant subrounded, coarse gravel to cobble (up to 5 inches in diameter) in upper 2 feet; abundant iron oxide staining; slightly porous; friable; massive	Qt	SM	[1] @ 3'	9.2	126.3 (100+)
	③ @ 6.5' Changes to light orangish brown, silty, fine grained sand		SM	[2] @ 4.5'	8.8	118.3 (98)*
	*Number in parentheses indicates percent relative compaction Total Depth = 8 Feet No Ground Water Encountered No Caving Backfilled 1/26/87					

GRAPHIC REPRESENTATION South Wall SCALE: 1" = 5' SURFACE SLOPE: 5° TREND: N77W →



LOG OF TRENCH NO: T-4

501-A - (3/77)

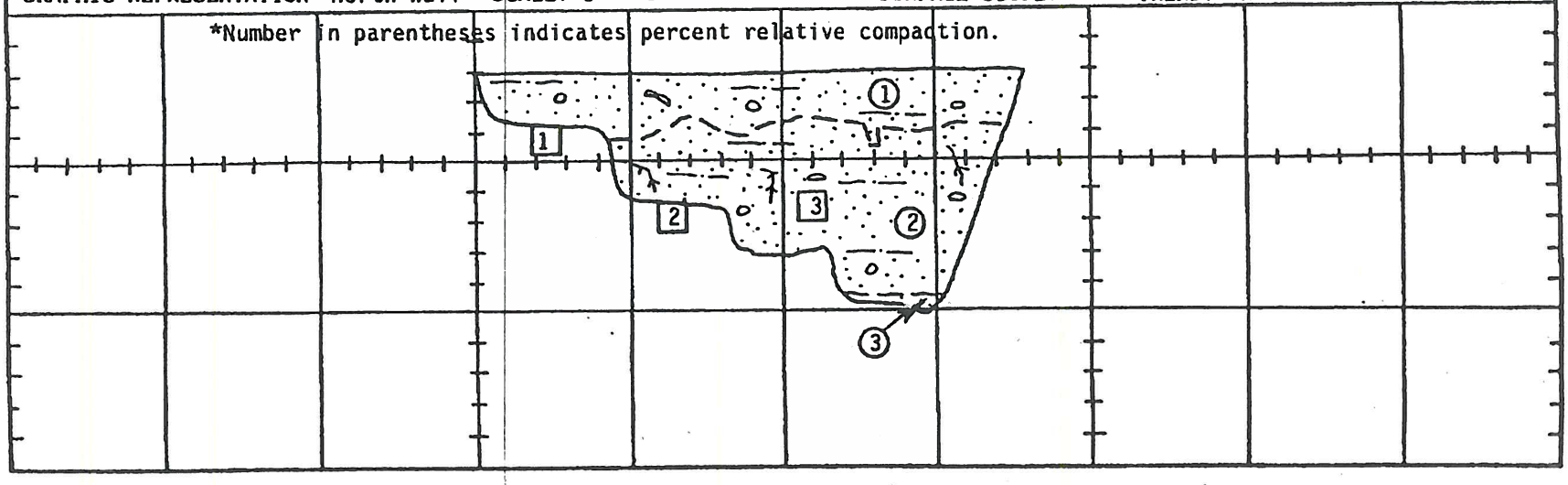
Leighton & Associates

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410
Logged By: RKW
Elevation: ±59'
TRENCH NO. T-5
Location: See Geotechnical Map

GEOLOGIC ATTITUDES	DATE: 1/26/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	(1) TOPSOIL: Dark brown, moist, loose to medium dense, silty, fine to medium grained sand; scattered subrounded, coarse sand to fine gravel; sharp, irregular lower contact; can distinquish where ripper blades have cut through the terrace deposits (infilled with topsoil); scattered wood chunks and plastic	Topsoil	SM			
	(2) TERRACE DEPOSITS: Orangish medium to dark brown, moist to very moist, dense, silty, fine to medium grained sand; scattered sub-rounded gravel; friable; scattered roots and decomposed organics; iron oxide staining; massive; homogeneous	Qt	SM	[1] @ 2'	10.2	117.5 (97)*
				[2] @ 4'	8.0	116.2 (96)
	(3) @ 7.5' Color changes to grayish light brown rounded gravel to fine cobbles	Qt	SM	[3]		
	Total Depth = 8 Feet No Ground Water Encountered No Caving Backfilled 1/26/87					

GRAPHIC REPRESENTATION North Wall SCALE: 1" = 5' SURFACE SLOPE: 0° TREND: N68E

*Number in parentheses indicates percent relative compaction.



LOG OF TRENCH NO: T-5

Leighton & Associates

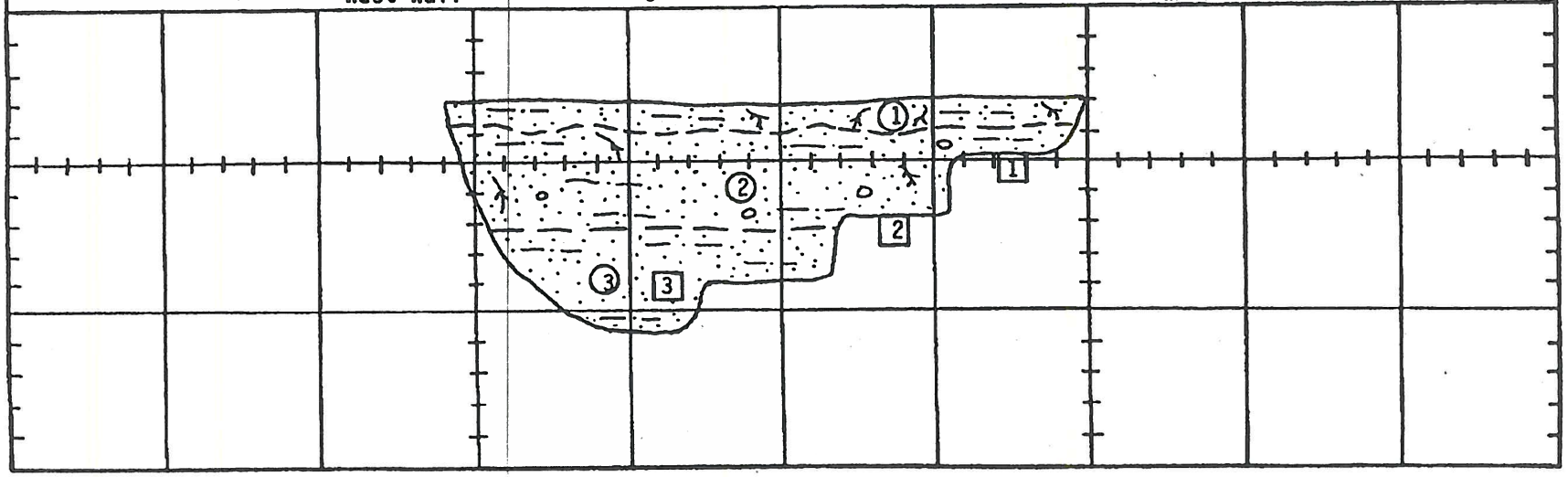
501-A - (3/77)

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410
Logged By: RKW
Elevation: ±64'
TRENCH NO: T-6
Location: See Geotechnical Map

GEOLOGIC ATTITUDES	DATE: 1/26/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	(1) TOPSOIL: Dark brown, damp, medium dense, silty, fine to medium grained sand; scattered roots and rootlets, sharp, irregular contact	Topsoil	SM			
	(2) TERRACE DEPOSITS: Orangish medium brown, damp to moist, dense, silty, fine to medium grained sand; friable, scattered subrounded gravel, calcium carbonate blebs in upper 2 feet, occasional roots and rootlets, slightly micaceous, iron oxide staining; massive	Qt	SM	[1] @ 2'	5.5	114.4 (95)*
	(3) @ 4' gradational change to orangish light brown with pockets of grayish light brown, silty sand	Qt	SM	[2] @ 4' [3]	4.7	122.4 (100+)

*Number in parentheses indicates percent relative compaction.
Total Depth = 7.5 Feet
No Ground Water Encountered
No Caving
Backfilled 1/26/87

GRAPHIC REPRESENTATION West Wall SCALE: 1" = 5' SURFACE SLOPE: 0° TREND: N8E →



LOG OF TRENCH NO: T-6

501-A - (3/77)

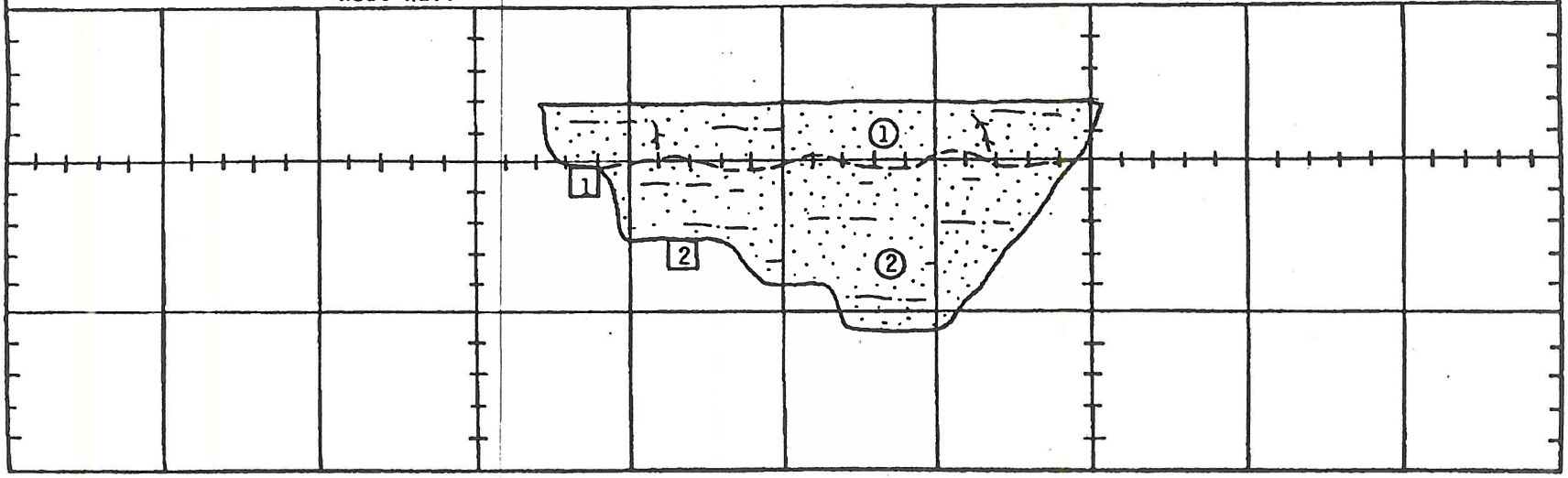
Leighton & Associates

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410
Logged By: RKW
Elevation: ±59'
TRENCH NO. T-7
Location: See Geotechnical Map

GEOLOGIC ATTITUDES	DATE: 1/26/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	① TOPSOIL: Dark brown, moist to very moist, medium dense, silty, fine to medium grained sand; occasional rootlets; sharp, undulating lower contact	Topsoil	SM	1 @ 2'	10.2	123.1 (100+)*
	② TERRACE DEPOSITS: Orangish medium brown, moist to very moist, dense, silty, fine to medium grained sand; slightly clayey; friable; some iron oxide staining; subrounded gravel; homogeneous; massive	Qt	SM	2 @ 4.5'	8.4	116.0 (95)

*Number in parentheses indicates percent relative compaction.
Total Depth = 7.5 Feet
No Ground Water Encountered
No Caving
Backfilled 1/26/87

GRAPHIC REPRESENTATION West Wall SCALE: 1" = 5' SURFACE SLOPE: 0° TREND: N25W →



LOG OF TRENCH NO: T-7

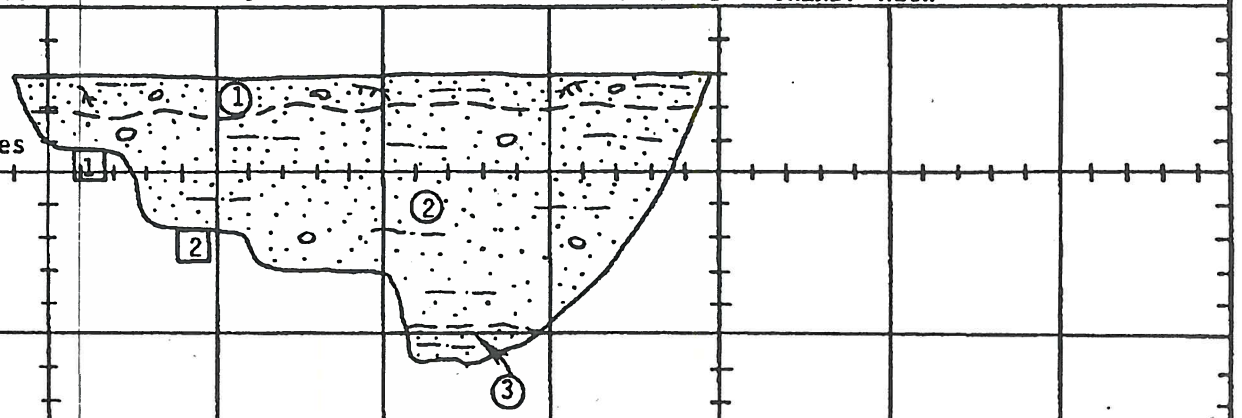
501-A - (5/77) Leighton & Associates

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410
Logged By: RKW
Elevation: ±58'
TRENCH NO. T-8
Location: See Geotechnical Map

GEOLOGIC ATTITUDES	DATE: 1/26/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	① TOPSOIL: Dark brown, moist, loose to medium dense, silty, fine to medium grained sand; roots and rootlets; occasional sub-rounded to subangular, coarse sand and fine gravel; sharp, irregular lower contact	Topsoil	SM			
	② TERRACE DEPOSITS: Orangish medium brown, moist, medium dense, silty, fine to medium grained sand; slightly clayey; occasional calcium carbonate blebs (up to 1/8 inch in diameter); occasional subrounded gravel; friable; homogeneous; iron oxide staining; massive	Qt	SM	[1] @ 2'	5.1	105.3 (87)
				[2] @ 4.5'	7.3	121.2 (99)
	③ @ 8' Mottled orangish medium brown and grayish light brown, very moist, medium dense to dense, silty, fine to medium grained sand; some iron oxide staining; massive	Qt	SM			

GRAPHIC REPRESENTATION West Wall SCALE: 1" = 5' SURFACE SLOPE: 0° TREND: N21W

Total Depth = 8.5 Feet
No Ground Water Encountered
No Caving
Backfilled 1/26/87
*Number in parentheses indicates percent relative compaction.



LOG OF TRENCH NO: T-8

501-A - (3/77)

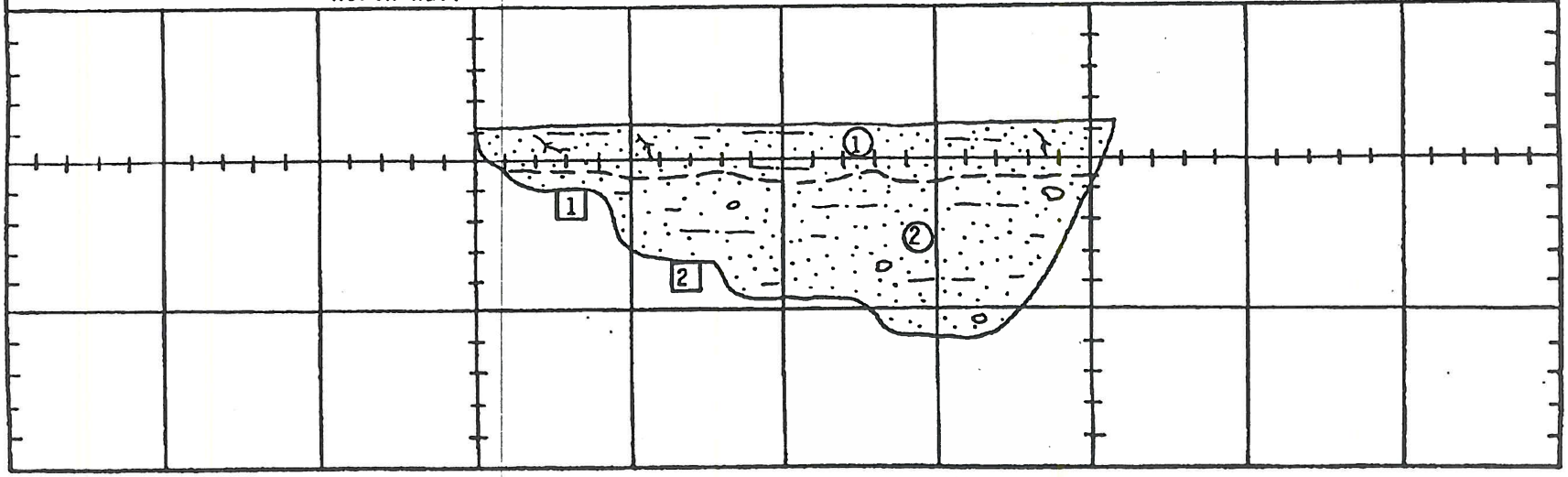
Leighton & Associates

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410
Logged By: RKW
Elevation: ±59'
TRENCH NO. T-9
Location: See Geotechnical Map

GEOLOGIC ATTITUDES	DATE: 1/26/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	(1) TOPSOIL: Dark brown, moist, loose to medium dense, silty, fine to medium grained sand; slightly clayey; scattered roots and rootlets; carbonized organic blebs (up to 1/8 inch in diameter); sharp, irregular lower contact	Topsoil	SM	1 @ 2'	8.8	117.3 (96)*
	(2) TERRACE DEPOSITS: Orangish medium brown, moist to very moist, dense silty, fine to medium grained sand; slightly clayey; occasional subrounded coarse sand and fine cobble; friable; homogeneous; few carbonized organic blebs (up to 1/16 inch in diameter); iron oxide staining; massive	Qt	SM	2 @ 4.5'	4.8	127.0 (100+)
	@ 7' contains pockets of grayish light brown, silty sand	Qt	SM			

*Number in parentheses indicates percent relative compaction.
Total Depth = 7 Feet
No Ground Water Encountered
No Caving
Backfilled 1/26/87

GRAPHIC REPRESENTATION North Wall SCALE: 1" = 5' SURFACE SLOPE: 0° TREND: N68E



LOG OF TRENCH NO: T-9

501-A - (3/77)

Leighton & Associates

501-A - (3/77)

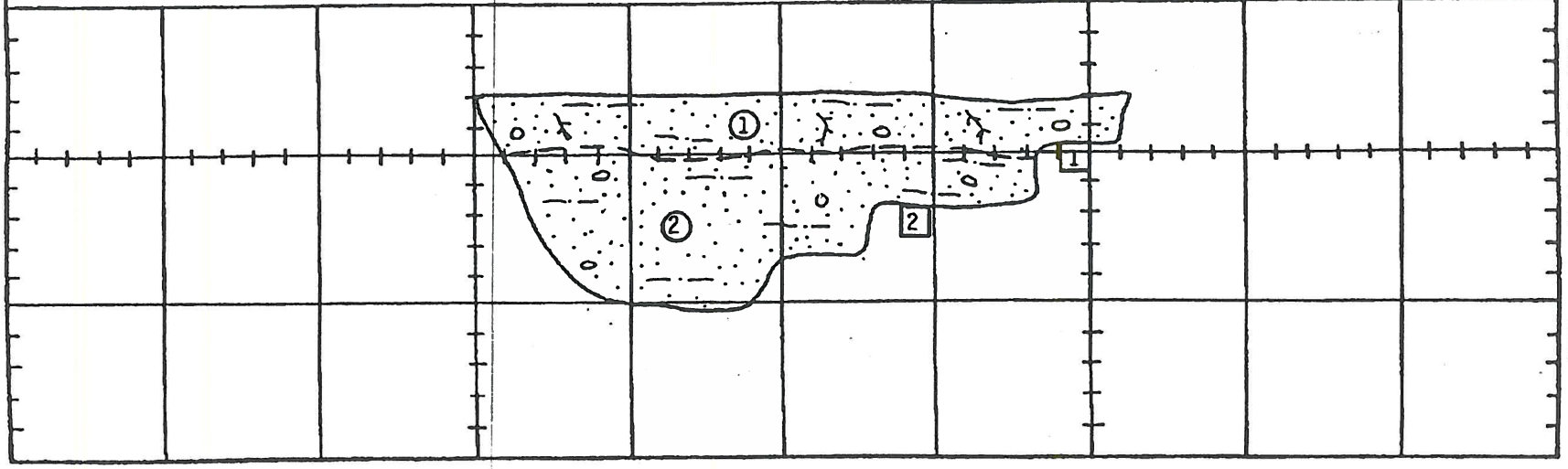
Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410

Logged By: RKW
Elevation: ±61'
Location: See Geotechnical Map

TRENCH NO. T-10

GEOLOGIC ATTITUDES	DATE: 1/27/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	① TOPSOIL: Dark brown, moist to very moist, loose to medium dense, silty, fine to medium grained sand; scattered roots and rootlets; few carbonized organic blebs (up to 1/16 inch in diameter); very few subrounded, coarse sand; sharp, irregular lower contact	Topsoil	SM	1 @ 2'	9.4	126.2 (100+)
	② TERRACE DEPOSITS: Orangish medium brown, moist to very moist, dense, silty, fine to medium grained sand; slightly clayey to 5 feet; very few subrounded coarse sand to fine gravel; friable; iron oxide staining; massive; homogeneous	Qt	SM	2 @ 4'	8.1	119.9 (98)*
	*Number in parentheses indicates percent relative compaction. Total Depth = 7 Feet No Ground Water Encountered No Caving Backfilled 1/27/87					

GRAPHIC REPRESENTATION North Wall SCALE: 1" = 5' SURFACE SLOPE: 0° TREND: N42E →



LOG OF TRENCH NO: T-10

Leighton & Associates

501-A - (3/77)

Leighton & Associates

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410

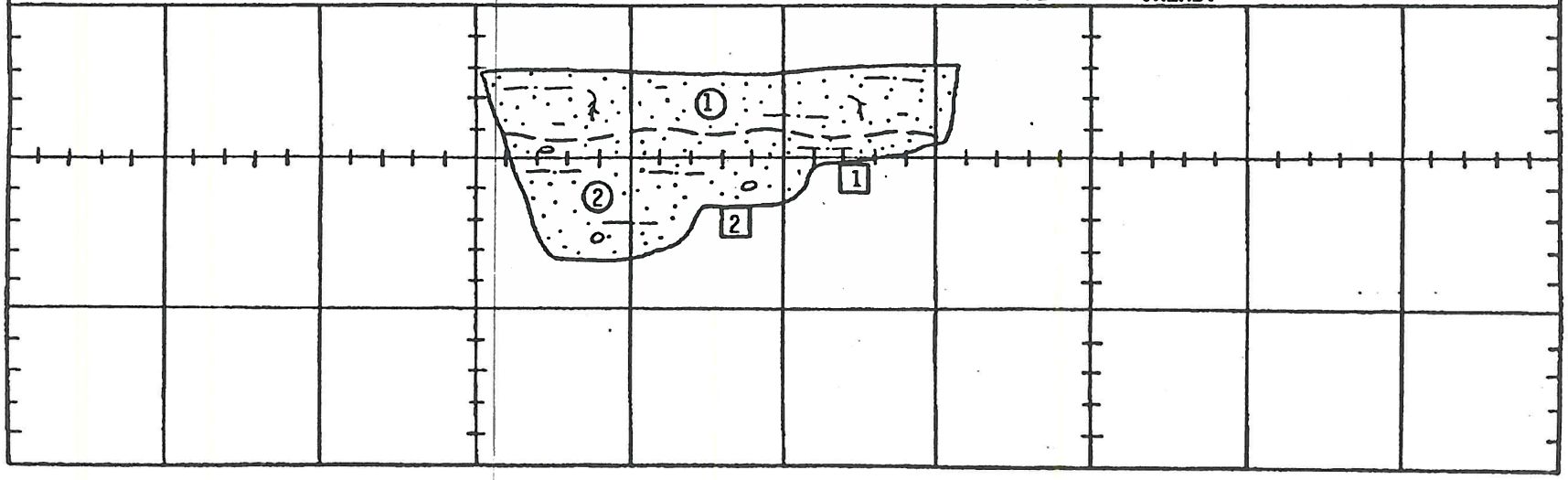
Logged By: RKW
Elevation: ±61'
Location: See Geotechnical Map

TRENCH NO. T-11

GEOLOGIC ATTITUDES	DATE: 1/27/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES U.S.C.S.	Sample No.	Moisture (%)	Density (pcf)
	① TOPSOIL: Dark brown, moist to very moist, loose to medium dense, silty, fine to medium grained sand; slightly clayey, occasional roots and rootlets; scattered organics and plastic; sharp, irregular lower contact	Topsoil	SM			
	② TERRACE DEPOSITS: Orangish medium brown, moist, dense, silty, fine to medium grained sand; homogeneous; friable; very few sub-rounded gravel; iron oxide staining; massive	Qt	SM	1 @ 3'	6.3	134.5 (100+)*
				2 @ 4.5'	8.7	135.4 (100+)

Total Depth = 6 Feet
No Ground Water Encountered
No Caving
Backfilled 1/27/87
*Number in parentheses indicates percent relative compaction.

GRAPHIC REPRESENTATION North Wall SCALE: 1" = 5' SURFACE SLOPE: 0° TREND: N70E →



LOG OF TRENCH NO: T-11

501-A - (3/77)

Project Name: Phase One/Carlsbad
Project Number: 8870059-01
Equipment: JD-410

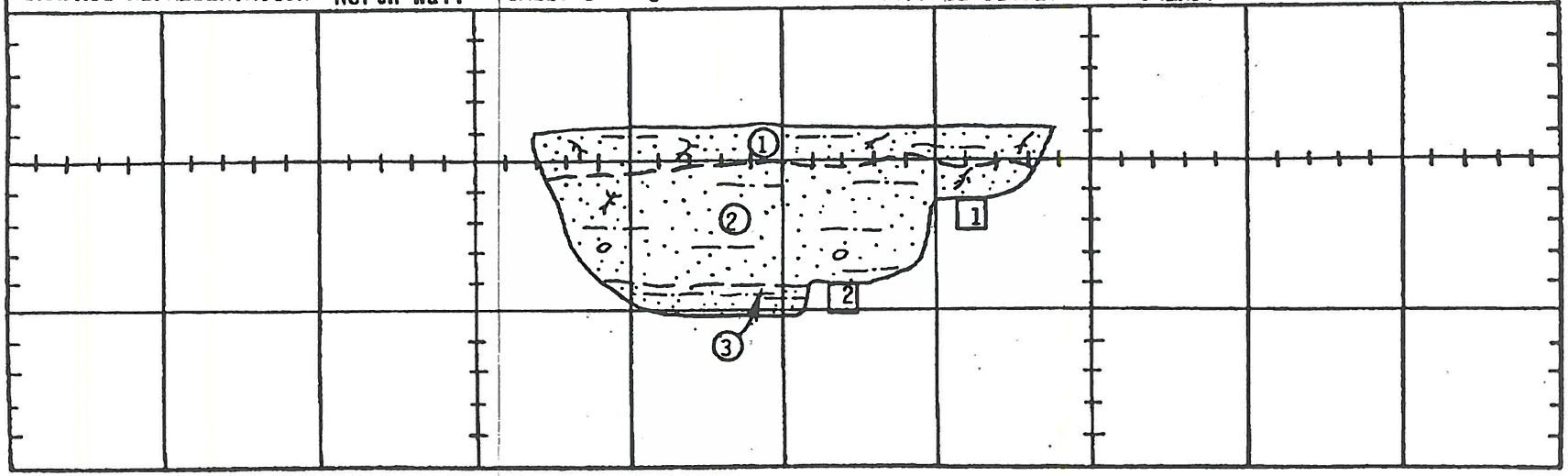
Logged By: RKW
Elevation: ±62'
Location: See Geotechnical Map

TRENCH NO. T-12

GEOLOGIC ATTITUDES	DATE: 1/27/87 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES			
				Sample No.	Moisture (%)	Density (pcf)
	① TOPSOIL: Medium to dark brown, moist, loose to medium dense, silty, fine to medium grained sand; scattered organics (decomposed) and plastic; scattered roots and rootlets; sharp, irregular lower contact	Topsoil	SM			
	② TERRACE DEPOSITS: Orangish medium brown, moist, dense, silty, fine to medium grained sand; few rootlets and roots; very few subrounded coarse sand to fine gravel; friable; homogeneous; iron oxide staining; massive	Qt	SM	[1] @ 2'	6.2	131.4 (100+)*
	③ @ 5' contains interbeds of light brown, silty, fine to medium grained sand; very friable	Qt	SM	[2] @ 5'	5.0	121.1 (99)

*Number in parentheses indicates percent relative compaction.
Total Depth = 6 Feet
No Ground Water Encountered
No Caving
Backfilled 1/27/87

GRAPHIC REPRESENTATION North Wall SCALE: 1" = 5' SURFACE SLOPE: 0° TREND: N67E →

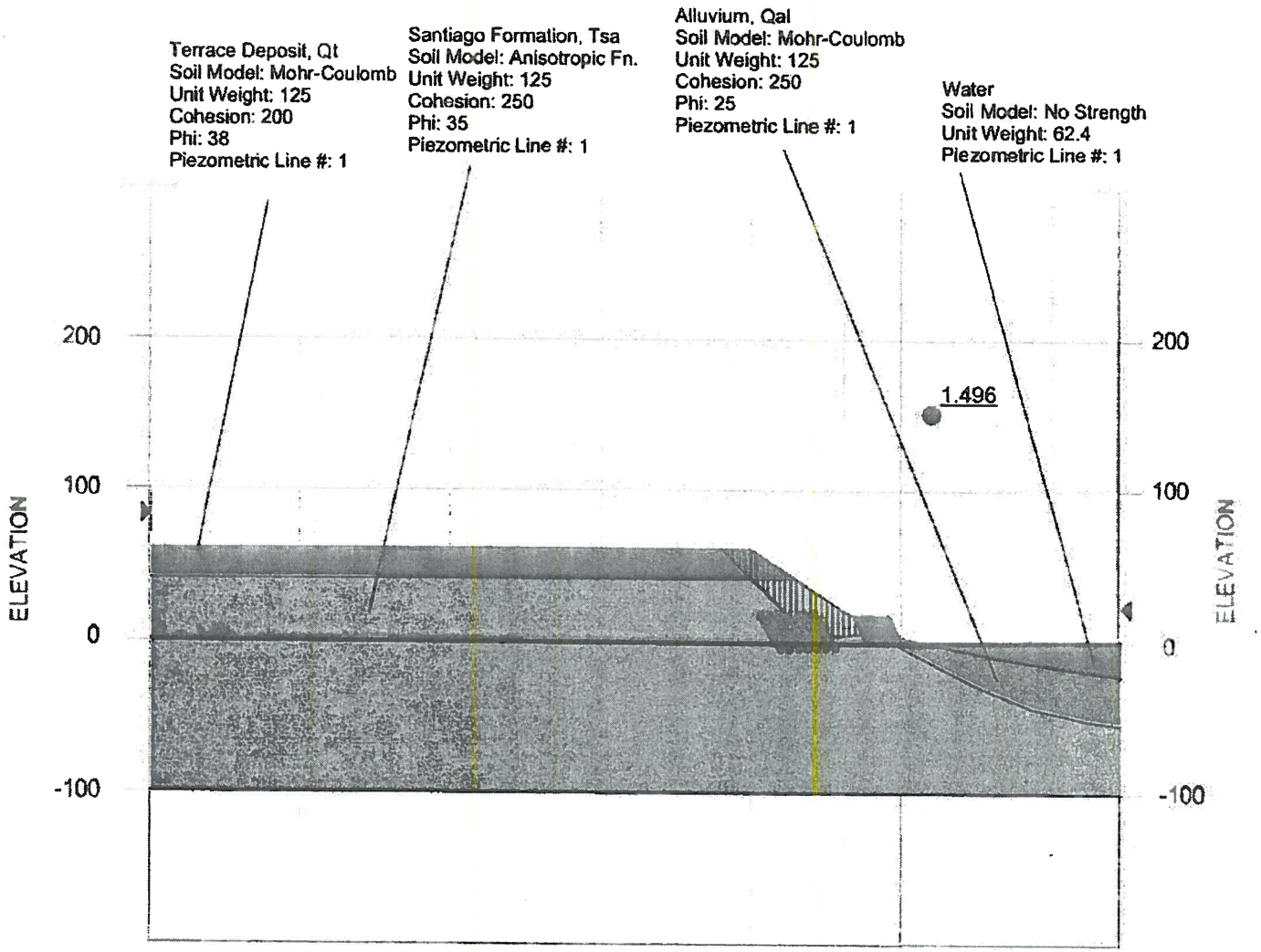


LOG OF TRENCH NO: T-12

Leighton & Associates

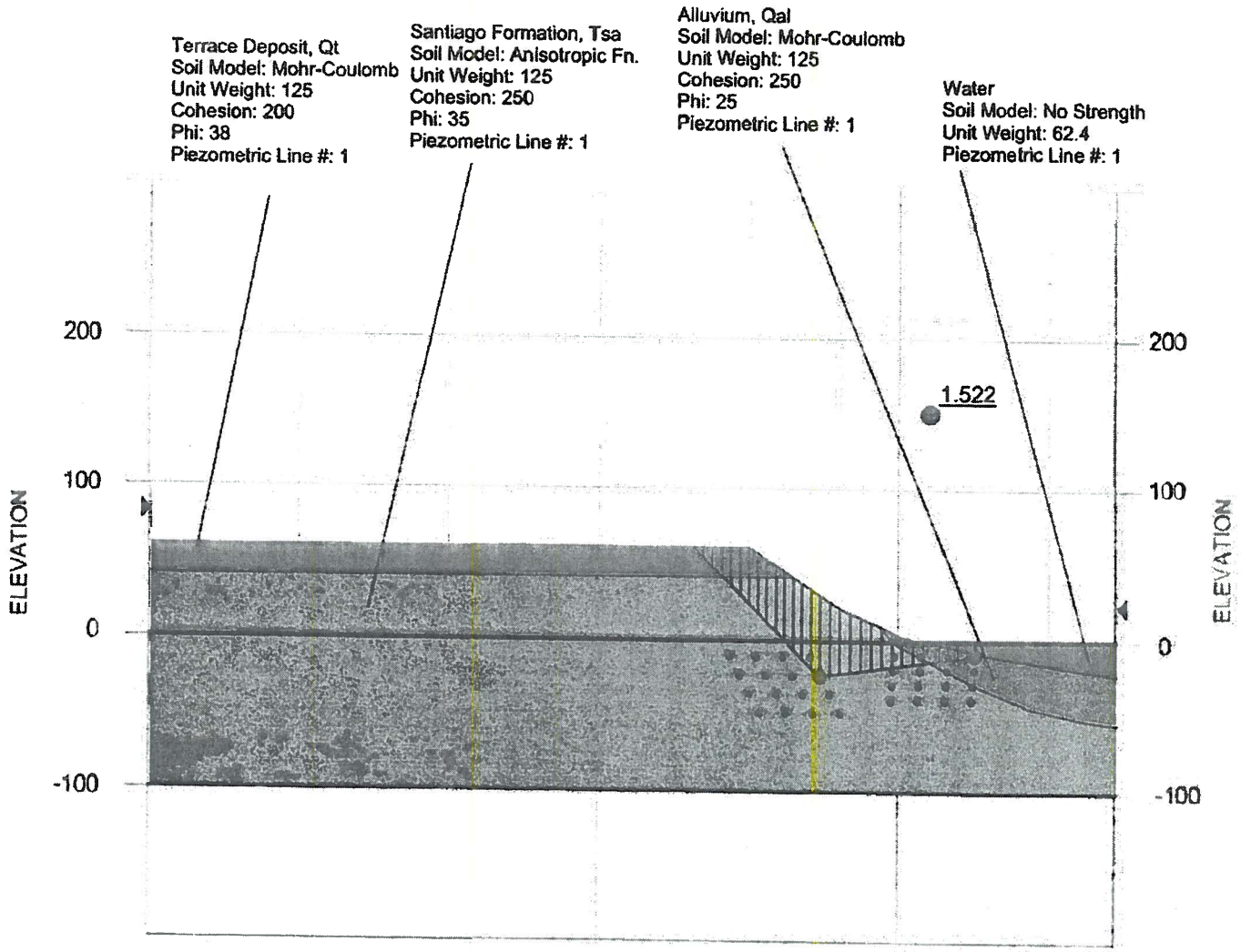
Lennar / Cannon DD
File Name: Section 1-1'.slz
Analysis Method: Spencer

Factor of Safety: 1.496



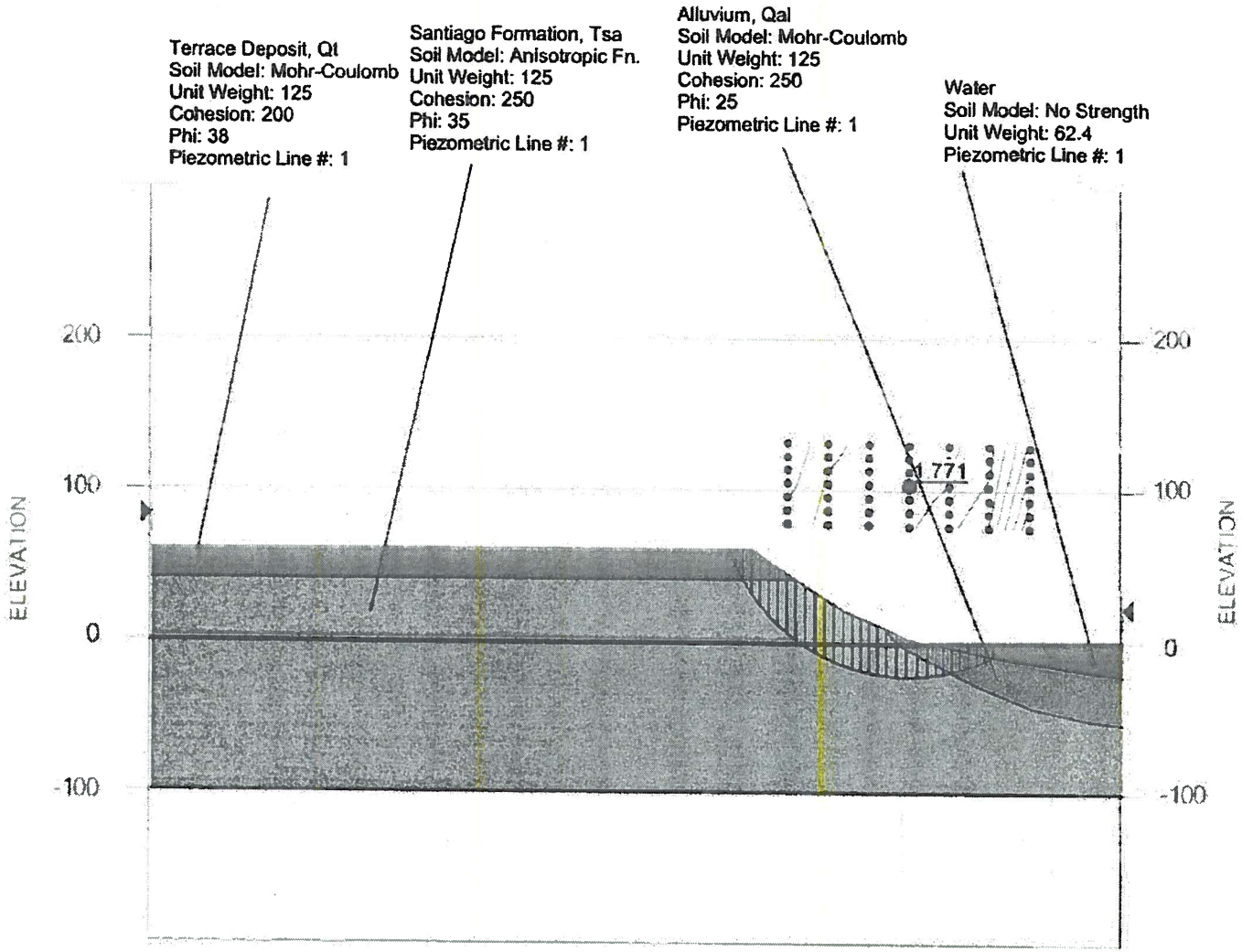
Lennar / Cannon DD
File Name: Section 1-1'a.slz
Analysis Method: Spencer

Factor of Safety: 1.522

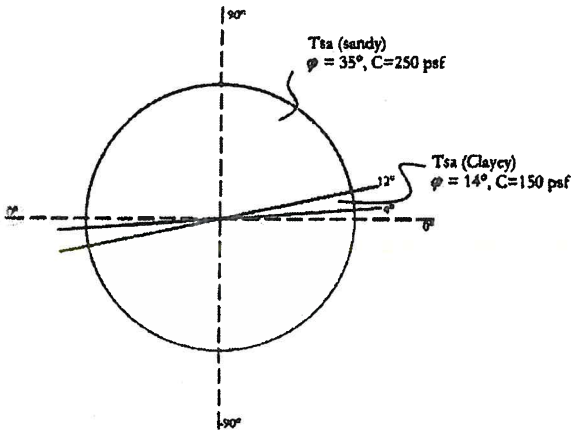


Lennar / Cannon DD
File Name: Section 1-1' Cr.slz
Analysis Method: Spencer

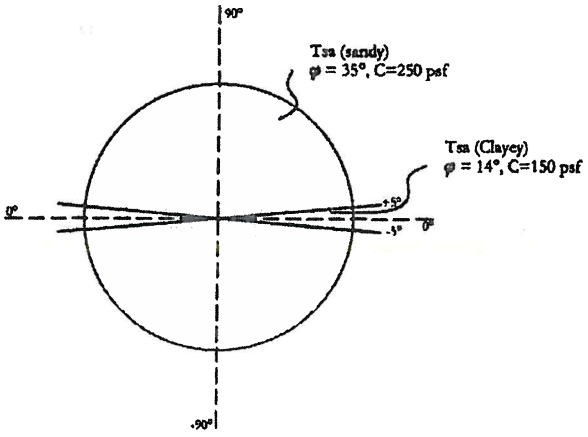
Factor of Safety: 1.771



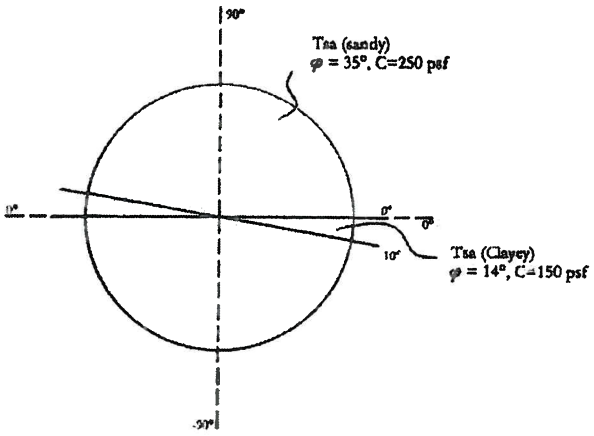
Definition of Anisotropic Functions for Tsa



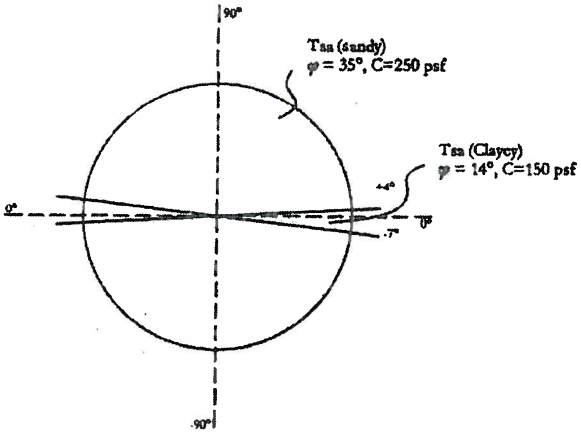
Section 1-1'



Section 2-2'



Sections 3-3' & 4--4'



Section 5-5'

APPENDIX D

ASFE INSERT

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from alight industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ-sometimes significantly from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in-this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer For Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

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